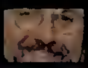
THE HOST WITH THE MOST Web hosting firms step up critical services. Page 39.



A BETTER WIRELESS LAN Sears' Michael LeRoy talks up the benefits of moving to an 802.11b system in about 900 stores. Page 16.

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March 19, 2001 Volume 18, Number 12

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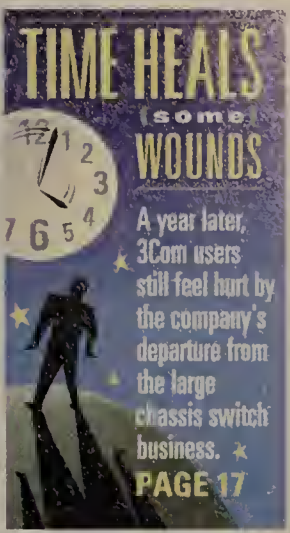


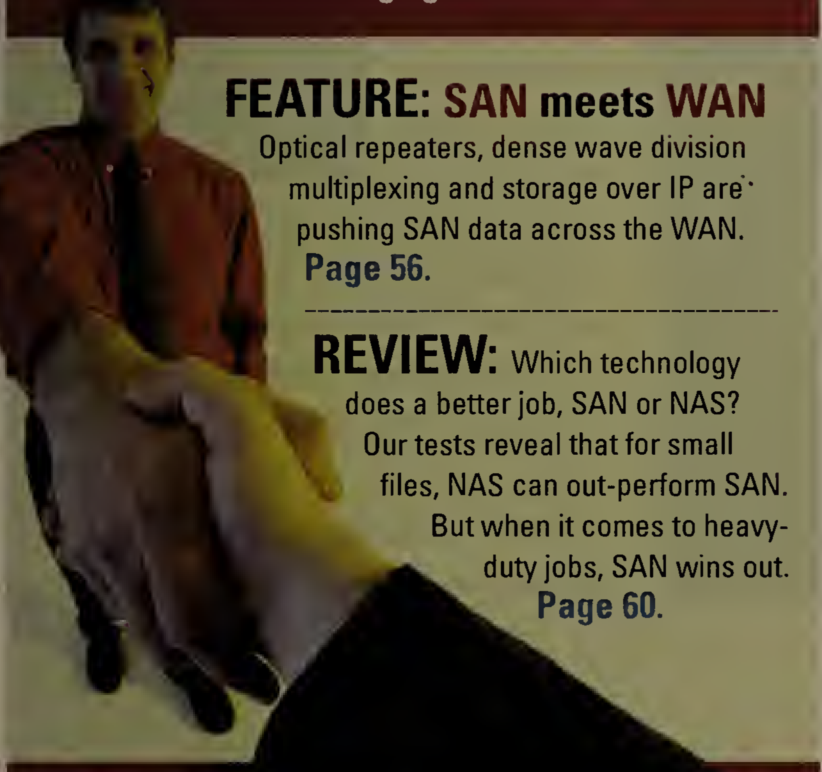
TIME HEALS (some) WOUNDS

A year later, 3Com users still feel hurt by the company's departure from the large chassis switch business.

PAGE 17

ALL OF A SUDDEN, STORAGE IS SEXY.

THE EXPLOSION of data traffic has created a demand for new ways to store and retrieve information. In this Technology Insider, we describe breakthroughs that extend storage-area networks to the wide area, and we conduct groundbreaking tests of storage gear.



FEATURE: SAN meets WAN Optical repeaters, dense wave division multiplexing and storage over IP are pushing SAN data across the WAN. Page 56.

REVIEW: Which technology does a better job, SAN or NAS? Our tests reveal that for small files, NAS can out-perform SAN. But when it comes to heavy-duty jobs, SAN wins out. Page 60.

EchoStar's Rick Nelson is extending his SAN across the WAN.

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Acquisition, new CEO fan doubts about Novell

BY DENI CONNOR

PROVO, UTAH — Beleaguered Novell heads into its annual BrainShare conference this week carrying a new leadership structure and a significant new acquisition that have customers and industry analysts questioning the wisdom of both.

The company last week announced that chairman and CEO Eric Schmidt — once hailed as a savior — would relinquish the CEO title and instead guide e-commerce and Internet undertakings as chief strategist. In conjunction with that move, Novell is acquiring e-business consulting company Cambridge Technology

See **Novell**, page 90

Eric Schmidt (left) is handing over Novell's CEO reins to Jack Messman once the Cambridge Technology Partners buyout goes through.

PHOTO: (LEFT) ©STEVEN BORNS 2001

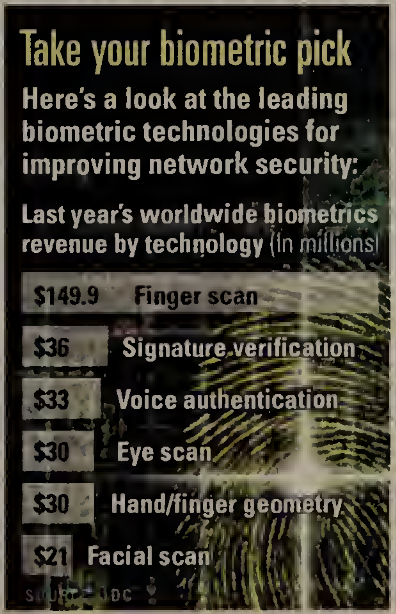
Pentagon interest may give biometrics needed boost

BY ELLEN MESSMER

BRIDGEPORT, W.VA. — In this rural outpost about a four-hour drive from the nation's capital, the Defense Department has set up its first biometrics testing laboratory to scientifically scrutinize hundreds of commercial products that scan unique physical traits — such as eye, finger or voice — to prove a person's identity.

The goal at the Biometrics Fusion Center, as the Defense Department calls it, is to determine if any of the nearly 600

See **Biometrics**, page 88



Take your biometric pick

Here's a look at the leading biometric technologies for improving network security:

Last year's worldwide biometrics revenue by technology (in millions)

$149.9	Finger scan
$36	Signature verification
$33	Voice authentication
$30	Eye scan
$30	Hand/finger geometry
$21	Facial scan

SOURCE: IDC

Market woes spare IT execs, plans ... so far

BY CAROLYN DUFFY MARSAN

The sky may be falling on Wall Street, but corporate IT executives are not yet reporting doom-and-gloom scenarios for their budgets or staffing levels.

Even at companies that are announcing massive layoffs, IT departments appear to be safe for now. Indeed, many companies that are suffering from the general slowdown in the U.S. economy are continuing to make strategic IT investments, particularly in Internet-related projects with measurable cost savings.

See **Spared**, page 92

When It Comes T
*e*Trust Can Prot

It's that sinking feeling in your stomach. That look your face makes every time you read a story about a disastrous corporate security breach. It's that nagging fear that won't go away no matter how many times you tell yourself there's nothing to worry about. Because there is, security is the number one concern of every IT professional for good reason. The good news is that there's a proven solution you can trust.

Without Bullet-Proof Security, Successful eBusiness Is Impossible

The only thing bigger than the opportunity that comes with putting your business on the Web is all the risk that goes with it.

Undetected attacks can strike at any time, from anywhere, in a mind-boggling variety of forms. Most sites can't even track every attempt. And new threats are developed every day, all over the world.

Without the right protection, eCompanies risk losing everything: data, customers, revenue, and more.

A Simple Solution To Your Most Complicated Challenge

Online business through eCommerce, corporate intranets, partner-to-partner transactions on extranets and websites, as well as their supporting enterprise-wide assets — all need to be secured. Protecting the integrity and availability of intranet information is critical to all organizations.

Web-enabled business applications open up all of your back-end and legacy systems to the world.

Unfortunately, in the race to become Web-enabled, security has taken a back seat. IT managers often give themselves a false sense of security with a standalone or partial security solution. They forget that security is only as strong as its weakest link and that eCompanies need an integrated and comprehensive security solution that provides best-of-breed functionality.

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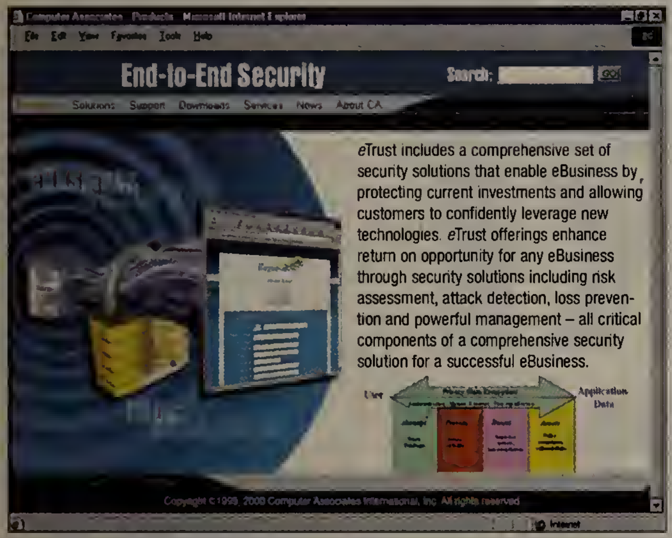

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NetworkWorld

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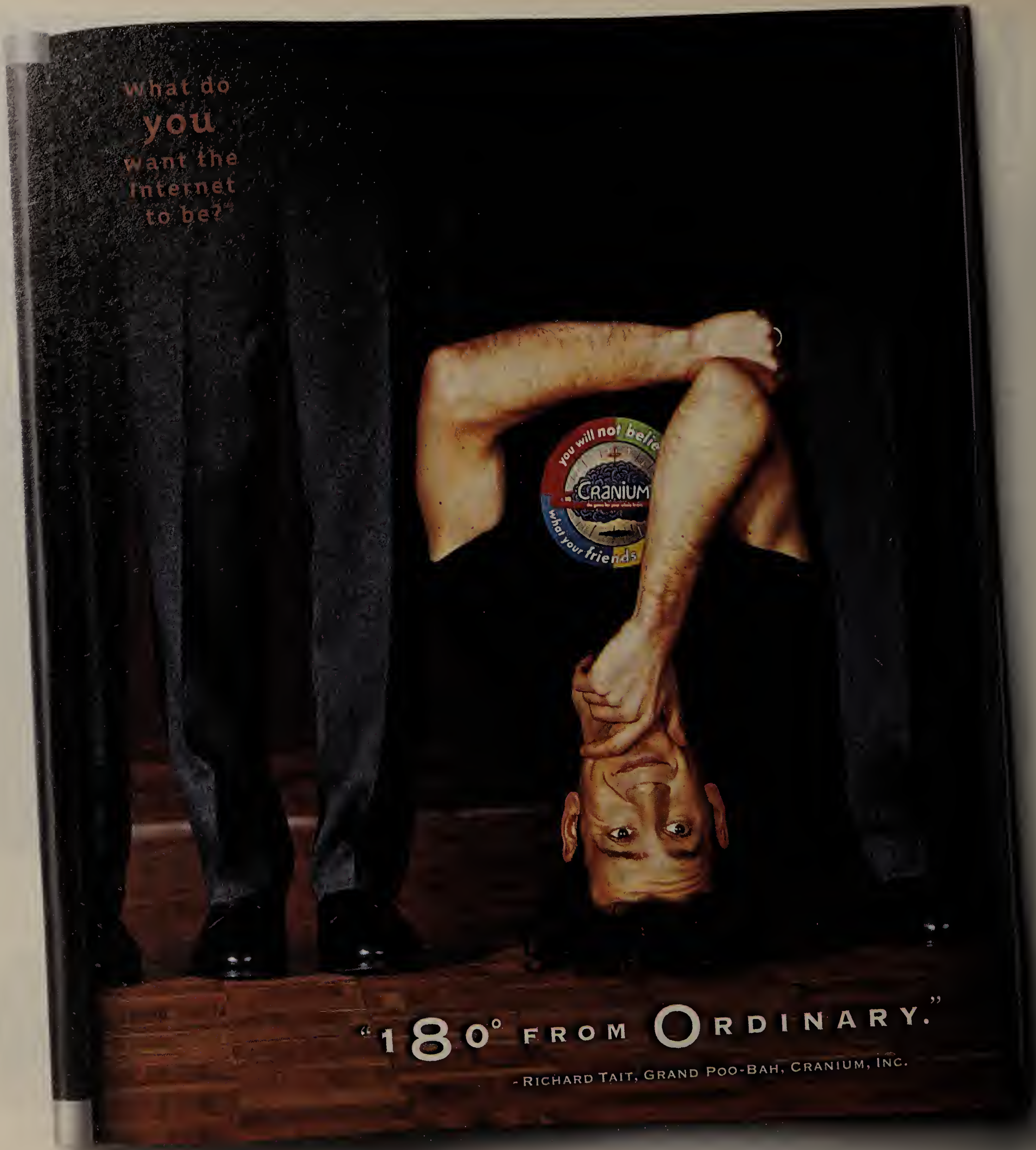

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REVIEWS

Firewall performance

Find out the results of Network World Global Test Alliance partner Opus One and Spirent Communications' speed testing of 16 high-end firewalls. **DocFinder: 3330**

SOHO routers

Does the Intel Express 8205 VPN Broadband Router live up to its promise of quick and easy deployment by small business and home users? Check out our test results and decide for yourself. **DocFinder: 3332**

Controlling network traffic

Read our review of Lightspeed's Total Control for e-Business. A breeze to use? We'll let you know. **DocFinder: 3428**

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Making a case for voice over IP

One reader asks: "Are there any real killer apps for VoIP today?" Check out the latest round of comments in our forum and join the discussion. **DocFinder: 3429**

From CEO to chief strategist

Read others' reactions to Eric Schmidt's departure in our Novell forum. What do you think of the move? **DocFinder: 3430**

Ponder your next career move

Every once in a while it's a good idea to reassess where you are in your career. Do you have what it takes to move up the corporate ladder — or do you even want to? *Network World's* personality test will help you determine if you're in the right line of work. **DocFinder: 3434**

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COONEY'S CORNER

The best of the NetFlash daily newsletter

Mergers, buyouts on the horizon?

The depressed stock and valuations of some big companies may result in a new round of mergers and acquisitions. One of the most interesting possibilities is that local telephone giant BellSouth could buy Sprint.

BellSouth has kicked the tires on a Sprint buy before, offering about $100 per share for the company almost two years ago (WorldCom came along with its $129 per share offer; ultimately the government nixed the deal).

But Sprint's stock is now worth about two-thirds of what it was then, which makes the long-distance carrier a prime target.

In addition to the economy, you can't get past the fact that this administration may be less likely to interfere with such a BellSouth-Sprint marriage.

Stay tuned. **DocFinder: 3438**

Exodus offers global storage with Scale Eight

Exodus is partnering with Scale Eight to offer an Internet-based storage service that lets users access documents and media files from anywhere in the world. **DocFinder: 3439**

Turnkey Linux package eases VPN installation

Network professionals can more easily set up and configure Linux-based VPNs in branch offices with software, services and hardware from OpenReach and Penguin Computing. **DocFinder: 3440**

NetScout tackles voice over IP and VPNs

NetScout Systems last week released an upgrade to its performance management product that industry observers say can help those users just starting to manage and secure their combined voice and data networks. **DocFinder: 3441**

— Michael Cooney, associate news editor

Sign up for this e-mail newsletter online. DocFinder: 3850

COLUMNISTS

Compendium

A bad rap for techies

Fusion Executive Editor Adam Gaffin reveals the latest school shooter was really a disgruntled skateboarder and not a computer geek. **DocFinder: 3431**

Keeping Current

Super Cisco

Columnist Fred McClimans muses over the strength of Cisco despite the 2,200 staff cuts. **DocFinder: 3432**

Help Desk

Choosing a tape rotation system

Ron Nutter answers a reader's question about implementing a tape rotation scheme. **DocFinder: 3433**

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NEWS BRIEFS, MARCH 19, 2001

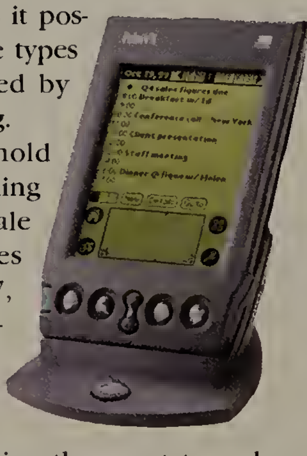
EDS lands $2.2 billion deal from Sabre

Online travel vendor Sabre has outsourced its entire IT infrastructure — including PCs, mainframes and a global, private data network — to Electronic Data Systems in a 10-year deal estimated at $2.2 billion. EDS beat out a field of competitors including IBM and Unisys for the Sabre contract, which is the largest transportation deal EDS has ever won. As part of the deal, EDS will upgrade Sabre's aging X.25 network, which connects 25,000 travel agents to the Internet's TCP/IP communications protocols, over the next three years. EDS will manage all Sabre's desktops, servers, mainframes and networks as well as host its Web sites, which include Travelocity for consumers and GetThere.com for business travelers. EDS also purchased Sabre's airline outsourcing business for $670 million. That acquisition includes data centers in Tulsa, Okla., and Fort Worth, Texas. EDS will merge Sabre's airline outsourcing business with its own.

Handheld-to-handheld combat

NCR last week filed a lawsuit that could send ripples through the handheld market, as the company alleges it possesses patents to the types of devices developed by Palm and Handspring.

NCR claims to hold two patents governing the creation and sale of handheld devices dating back to 1987, according to documents filed in U.S. District Court in Delaware. NCR, of Dayton, Ohio, is asking the court to order Palm and Handspring to stop selling their handheld devices.



Palm and Handspring were not available for comment.

End appears near for ASP Agillion

Agillion is the latest application service provider to fall victim to a tough funding environment, announcing last week it would lay off all but a handful of employees and put itself up for sale, according to published reports.

James Travers, who took the helm of Agillion in November, reportedly planned to resign after failing to help the company raise enough money to stay in business.

Steve Papermaster, who founded Agillion with former Tivoli CEO Frank Moss, reportedly will help oversee the company's sale. Papermaster and Moss launched the company in 1998 and a year later received more than $40 million from lead investor Goldman Sachs and several other heavyweights.

A rose-colored crystal ball?

Notwithstanding the current woes on Wall Street, revenue derived from worldwide business-to-business Internet commerce will total $8.5 trillion in 2005, according to research released last week by Gartner Group. The research also shows that worldwide business-to-business Internet commerce sales transactions reached $433 billion last year, a 189% increase from 1999. The research firm predicts business-to-business sales will total $919 billion this year.

PSINet unloads unit to raise cash

Troubled PSINet last week said it will sell its e-commerce data communications unit, PSINet Transaction Solutions, for $300 million to an investment group led by GTCR Golder Rauner. The Internet service provider says the deal, which is expected to be completed by April 30, may not be enough to prevent a restructuring of its operations or refinancing of debt.

Flaw in TCP raises concerns

Another security flaw has emerged with communications based on TCP that could be used to "hijack" a user's session on the Internet or a corporate network, a computer security services company announced last week. Tim Newsham, a senior research scientist with Guardent, of Waltham, Mass., discovered the TCP vulnerability. Newsham's research exposes a weakness in the generation of TCP's Initial Sequence Numbers (ISN), which are used to maintain session information between network devices. ISNs are used as a handshake between two machines, identifying legitimate packet traffic. The numbers are randomly generated, but they can be guessed with a high rate of accuracy, the company says. Sequence numbers coupled with session information could provide network access and offer a launching pad to conduct sophisticated network attacks.

Companies claim fiber speed mark

Two companies claim to have reached a new speed record for data transmission over an existing fiber-optic network. Optisphere Networks, a subsidiary of German electronics and engineering conglomerate Siemens AG and WorldCom, say they managed to transmit 3.2 terabit/sec of data across a total distance of 250 kilometers in a month-long trial. The test, using WorldCom's fiber network routes in the Dallas metropolitan area, is the equivalent of sending more than 3.2 million high-speed Internet connections or 41 million telephone calls at the same time on one fiber, Siemens says. The companies used Siemens/Optisphere's TransXpress Infinity dense wavelength division multiplexing platform and FOX 40G bit/sec multiplexer.

Microsoft preparing a Hailstorm of Web services

BY JOHN FONTANA

Microsoft this week plans to take another of many slow and lumbering steps on the road to explaining its .Net strategy.

The company is expected to unveil a series of Web services — code-named Hailstorm — which will help define .Net, a plan to deliver software as a set of services available over the Internet. The idea behind Hailstorm is that its components will help corporate and other developers more easily build applications that run on .Net infrastructure servers, including Windows 2000, Exchange 2000 and SQL Server 2000.

Chief Software Architect Bill Gates will introduce Hailstorm as a set of "building blocks" of reusable code that can be added to .Net applications designed to live on a network.

The Hailstorm building blocks include Passport, Microsoft's online user identification service, and MSN Messenger instant messaging. Those Web services will provide user identity or messaging services to .Net applications.

Microsoft said last year it would deliver these and other Web services, including personal subscription and storage services, as some of the first .Net components.

The building blocks are much like the chunks of code Microsoft provides to ease development of Windows-specific applications.

Microsoft will include Passport and MSN Messenger services in the upcoming desktop operating system Windows XP. But Hailstorm extends the services, especially MSN Messenger, letting it become a development platform instead of just a single application.

Microsoft would not comment on the announcement.

Observers say Hailstorm could form the foundation of secure Internet-based messaging middleware similar to Microsoft Message Queue Server that lets applications communicate with each other asynchronously. Such middleware would support applications that rely on a series of transactions with other systems, especially e-commerce applications running over the Internet.

"Microsoft could be looking at developing lightweight message queuing that works over HTTP, can traverse firewalls, and allow applications to publish and subscribe to each others' events," says James Kobielus, an analyst with The Burton Group.

Bill Gates: Microsoft chief architect will add piece to .Net puzzle.

Message queuing would let an event that happens on one system, such as the approval of a shipping order, be instantly sent to another application, such as an e-commerce application, that subscribes to that event.

On the corporate side, developers say Hailstorm may tie MSN Messenger into Exchange.

Hailstorm's MSN Messenger component can use Exchange and its Web Storage System as its back end, according to sources. Applications using MSN Messenger could deliver not only instant messaging, but also regular e-mail or audio- and videoconferencing.

Hailstorm will transform Exchange protocols into XML, a foundation technology for .Net, and show them to developers.

While Microsoft has not revealed the release date of Hailstorm, it's likely Passport will be integrated with future versions of Active Directory and MSN Messenger with the next version of Exchange or Yukon, a universal data store being developed for .Net. ◪

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WorldCom offers managed hosting packages

BY JENNIFER MEARS AND DENISE PAPPALARDO

LOS ANGELES — WorldCom has laid out a series of managed Web hosting packages it says will help corporate customers get e-commerce initiatives up and running in as little as two weeks.

WorldCom last week unveiled its managed packages at Internet World. The packages offer customers preconfigured software, including security, reporting, administration, monitoring and back-up services, and hardware-hosting bundles with a guaranteed time of installation. WorldCom's managed hosting packages — 18 in all — are varied to meet the needs of businesses of all sizes, from low-end, single-server Web sites to high-availability e-commerce sites.

The services will compete with similar packages from Web hoster Genuity and telecom companies such as AT&T. Genuity's Black Rocket services, launched last fall, for example, come with a guarantee that the platform will be installed within 10 days. WorldCom guarantees installation of between 10 and 15 days, depending on the package.

"It's a general trend across the industry to develop these standard packages, putting together the hardware element and the software element, monitoring and managing capabilities, all together in a package," says Melanie Posey, an analyst with market research firm IDC. "Then if customization is required, that ends up being an additional thing. It's not always a requirement for every company to have customization."

That's the reason WorldCom is offering the packages. "Not everything you do in managed hosting can be a custom bid," says Ron McMurtrie, vice president for e-services at WorldCom.

WorldCom's packages run on Windows NT, Windows 2000 and Solaris platforms, and include multiple servers, load balancing, database servers, Web Trends and Secure Sockets Layer tunneling support.

Each of the packages includes software, Internet connectivity and a service-level agreement. In addition, the technical service and support offered ranges from 24-7 help desk availability to a round-the-clock support team with a single point of contact, WorldCom executives say.

The company is using its alliance with managed hosting service provider Digex to offer the managed services. WorldCom announced in September of last year that it was acquiring Intermedia, the majority shareholder of Digex, for $6 billion. The acquisition was delayed, and WorldCom recently resolved issues raised by Digex shareholders unhappy with terms of the merger. The merger awaits final approval.

Still, WorldCom started reselling Digex Web hosting services under a separate agreement last November, but only custom services were available.

"We've decided how we're going to move forward with Digex," McMurtrie says. WorldCom is integrating Web server hosting environments in its data centers around the world. Originally the company talked about using Digex data centers exclusively, but now says it will

See **WorldCom**, page 88

Bundled up

WorldCom is offering six preconfigured managed hosting packages that can run on three different platforms. The table below outlines three of those packages.

	Single-server site	Intermediate commerce site	High-availability application site
Description	All features on a single server.	• High performance and redundancy. • Redundant firewall. • Database server on a separate VLAN for security.	• SSL accelerator and dedicated load balancer provide maximum performance. • Service features to support the mission-critical nature of the site.
Hardware	One server with Web server database; allows any customer applications to reside on the same server.	Two load-balanced Web servers, dedicated database server and fail-over firewall.	Four load-balanced Web servers using redundant dedicated load balancers, two application servers, one reporting server, two SSL accelerators and two sets of failover firewalls.
Pricing	One-time installation charge; monthly fees from $4,140 on Windows NT to $10,020 on Solaris.	One-time installation charge; monthly fees from $13,585 on NT to $28,105 on Solaris.	One-time installation charge; monthly fees range from $66,195 on NT to $99,733 on Solaris.

Sprint advances application-hosting plans

Carrier partners with Sun; adds mobile applications consulting practice.

BY MICHAEL MARTIN

KANSAS CITY, MO. — Sprint last week enhanced its application-hosting strategy by unveiling an alliance with Sun and adding a consulting practice that will focus on mobile commerce applications.

While Sprint is playing catch-up in the data center market, integrating wireless capabilities into its hosted offering could set the provider apart from other players in the increasingly crowded managed data center market.

"Being able to offer the wireless applications will be important, especially for enterprises with large sales forces that rely heavily on mobile connections," says David Tapper, an analyst with research firm IDC.

Sprint may offer applications such as customer relationship management software that would allow mobile sales forces to check orders, availability and pricing from a mobile device or laptop.

The Sun alliance will see Sprint and Sun combine sales and marketing teams to offer enterprise customers hosted services based on Sun hardware and software and Sprint's data centers and IP backbone.

Sun products included will be Sun Enterprise servers and storage devices running Solaris, and software from iPlanet E-Commerce Solutions, a Sun-Netscape venture. Sprint and Sun will also offer customers consulting.

Sprint has a lot of ground to make up in the data center market. The company recently opened its first data center in New York and will have centers up in Boston and Kansas City, Mo., within the next few weeks. Ultimately Sprint plans to build 18 data centers by the end of 2002.

To help companies looking to extend commerce applications to wireless devices, Sprint is introducing its E-Solutions Enterprise Mobile Practice, which will deliver network and device-independent mobile commerce applications.

"Our goal obviously would be to see customers host their mobile applications at Sprint Internet Centers," says Keith Paglusch, president of E-Solutions. "But because [the applications developed via this consulting practice will be] network-independent, they don't have to."

Tapper says Sprint's alliance with Sun was a necessary step to fulfill the needs of potential enterprise customers.

"Customers want a managed service environment," he says. "Now Sprint can say that they have a partner that allows them to offer those services."

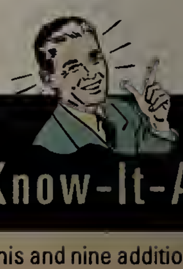
Sprint's alliance with Sun is not an exclusive partnership.

"Sun partners with pretty much everyone in the data center market,"Tapper says.

The Sun partnership is only the first step in Sprint becoming a serious IT outsourcing provider,Tapper adds.

"They're going to have to showcase what they can do with some big accounts," he says. "That's what they're going to have to do to separate themselves from the pack." ◪

Read more about Web hosting firms that are stepping up their services. Page 39.



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This week's question:

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IBM unveils software for mainframes

BY KATHLEEN OHLSON

SOMERS, N.Y. — Taking aim at its mainframe customers, IBM has unfurled an enhanced version of its flagship e-commerce WebSphere software that would let the Big Iron more efficiently handle complex e-business transactions.

Announced last week, WebSphere Application Server 4.0 features support for Java2 Enterprise Edition (J2EE), which lets users uniformly build Java business applications. With the J2EE feature, users would be able to link new e-business applications that can tap legacy information from CICS transaction applications or IBM's DB2 database.

WebSphere has also been enhanced to run on IBM's new z/OS 64-bit operating system for the mainframe. The software supports existing OS/390 users.

In addition, IBM added J2EE support to its CICS Transaction Server Version 2.1 so users can more easily bring legacy data from CICS transactions into Web-based applications.

IBM hopes to keep mainframe users in the fold by letting them employ the big box as an application server for Web sites by allowing them to more easily build new applications that can be integrated with OS/390's extensive inventory of applications. The idea is to keep users from moving to large Sun or Unix servers.

In some cases, mainframes have been turned aside in favor of sleeker, less expensive and flexible Unix and Windows NT servers, says Dale Vecchio, an analyst at Gartner. "[But] there's so much technology in [a business' systems] installed base that [IT staffers] are bringing mainframes back in the conversation as a viable alternative for server consolidation,"Vecchio says.

Pricing for WebSphere 4.0, which will be available March 30, is $35,000.

IBM: www.ibm.com/websphere

Infolibria touts Web caching for less

DynaCache 5 could help enterprise users save WAN bandwidth locally.

BY PHIL HOCHMUTH

WALTHAM, MASS. — Infolibria this week will debut a Web caching appliance for midsize companies that want to add caching and content delivery, but don't need an expensive high-end box.

DynaCache 5 is a rack-mountable Web caching device that could help enterprise users save WAN bandwidth by locally storing frequently visited Web and intranet sites on a LAN. Service providers could use the device for pushing Web content geographically closer to customers.

In an enterprise deployment, the box would sit between a company's LAN switch and the WAN router link. When a user loads a Web page, the content is pulled from the Web and saved on the device.

The device scans outgoing requests for content it may have in its cache and can deliver this content locally, which improves speed and lowers WAN bandwidth utilization. The device has 40G bytes of storage and can support 200 and 1,000 users.

Products that perform similar tasks on a larger scale are available from Infolibria and its competitors, such as F5 Networks and CacheFlow.

The cost for competing products can range from $15,000 to $20,000, compared to DynaCache 5's $7,500.

"A lot of people are looking at replacing their [software-based] proxy cache infrastructures, such the Windows and Netscape proxy servers, and the Novell BorderManager stuff," says Peter Firstbrook, a META Group analyst.

More appliance-style boxes that can handle Web caching less expensively, should be popular with network professionals and become more available in the near future, he says.

Firstbrook adds that increased competition for these users — especially from new market entrants such as Volera, a Novell spin-off Web caching firm — will bring down the cost for these types of devices.

DynaCache 5 is available now.

Infolibria: www.infolibria.com

RedSiren couples management with security

BY DENISE DUBIE

PITTSBURGH — RedSiren Technologies, a company that provides network monitoring and security services, this week added a Web-based interface so customers can more easily see how RedSiren is managing their networks.

The company expanded its 1stWatch network availability, performance and security monitoring service to include a portal, called 1stView. 1stView lets customers check the status of network devices, applications and security systems being monitored at RedSiren's remote operations center (ROC) over the Web.

RedSiren says it differs from other managed service providers (MSP) by bundling security services into its offerings. RedSiren includes access control, encryption, firewall, authentication and antivirus software in its service package.

The firm can also offer years of network security experience, as evidenced with the backgrounds of its executive team. That team includes L. Dain Gary, chief security officer, who co-founded Carnegie Mellon University's Computer Emergency Response Team program, and CTO P. Andrew MacDowell who spent years at Adelphia Communications, Banker's Trust and the Pentagon.

It's pretty standard for MSPs to have a secure connection with their customers through a VPN, says Tim Grieser, research director at IDC. Because companies in part trust their networks to a third party, he says RedSiren's inclusion of security management sets it apart.

"In terms of Web hosting and Web operations, security is the top concern, with availability and performance a close second," he says.

RedSiren configures and installs a server on a customer site and connects that box to its ROC via a secure VPN. RedSiren also uses public-key infrastructure technology and assigns customers a digital certificate to further ensure secure access to and from the customer and RedSiren's location.

RedSiren uses products such as BMC's Patrol, RSA Security's digital certificates and Micromuse's NetCool at its ROCs to manage customer networks. And if customers have pre-existing tools such as Hewlett-Packard OpenView or CA Unicenter, RedSiren says it can also collect the SNMP traps from those products. For alerting beyond that performed by Patrol or NetCool, RedSiren staff will contact a customer IT administrator when network problems escalate and work with a customer's vendor to reach resolution.

"[RedSiren] is letting customers know they will help with the burden of day-to-day systems management and security so internal IT staff can use the time to perform the high-level jobs," Grieser says. Although it's a fairly new trend for MSPs to offer "multifunctional" service packages, RedSiren is already competing with fellow MSPs TriActive and 2ndWave.

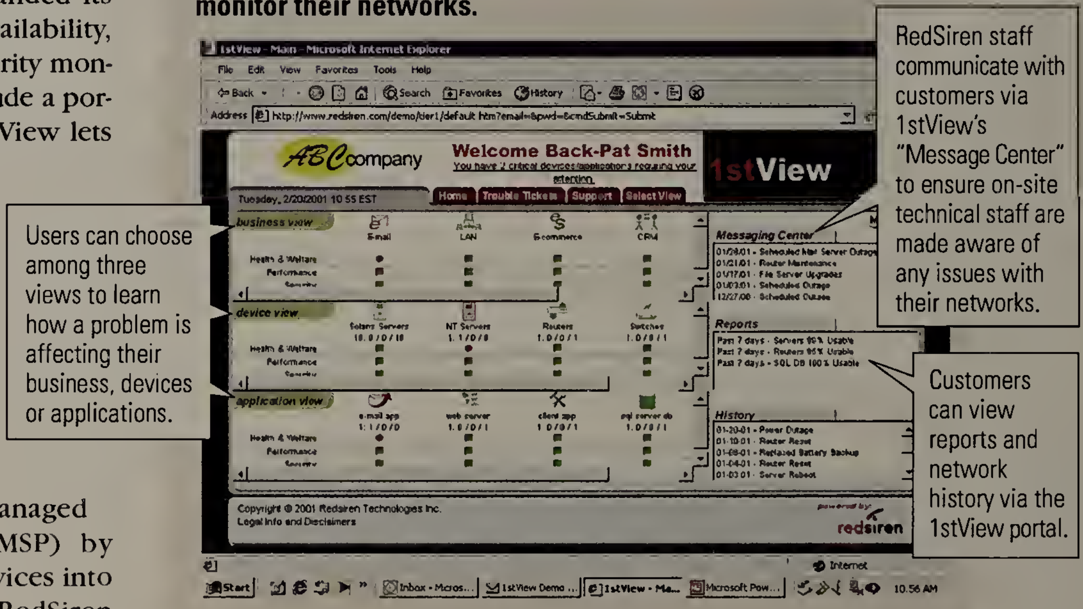
RedSiren recently received capital funding from Redleaf Group, joined the MSP Association and signed U.S. Steel as a customer.

Depending on network configuration and level of service, pricing for 1stWatch, which includes 1stView, starts from $2,000 to $4,000 per month for 10 servers. All services are available now.

RedSiren: www.redsiren.com

Code red

RedSiren's 1stView Web interface lets customers watch the MSP monitor their networks.



01/28/01 - Scheduled Mail Server Outage
01/21/01 - Router Maintenance
01/17/01 - File Server Upgrades
01/03/01 - Scheduled Outage
12/27/00 - Scheduled Outage

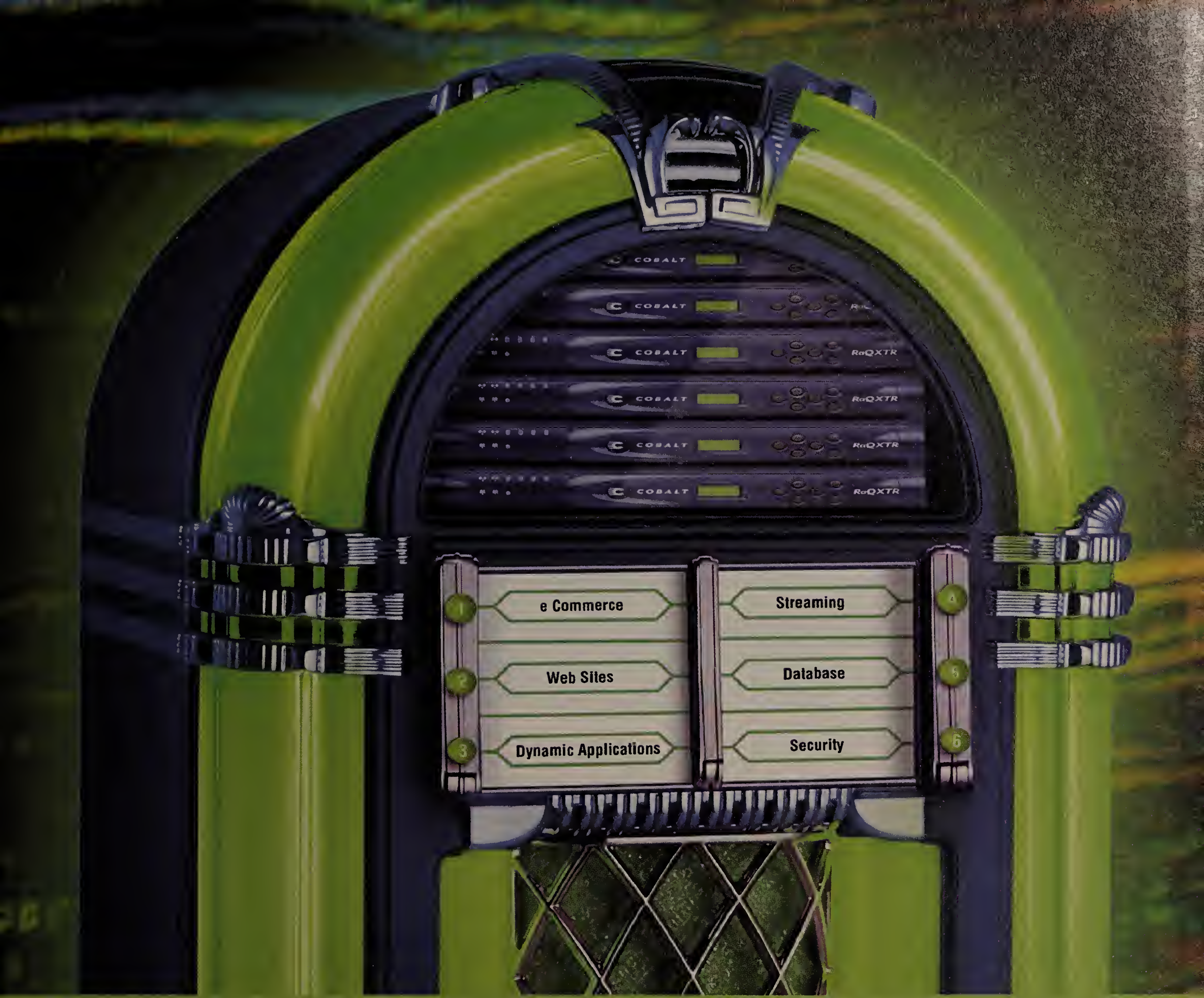
Past 7 days - Servers 99% Usable
Past 7 days - Routers 95% Usable
Past 7 days - SQL DB 100% Usable

01-20-01 - Power Outage
01-10-01 - Router Reset
01-08-01 - Replaced Battery Backup
01-04-01 - Router Reset
01-03-01 - Server Reboot

Users can choose among three views to learn how a problem is affecting their business, devices or applications.

RedSiren staff communicate with customers via 1stView's "Message Center" to ensure on-site technical staff are made aware of any issues with their networks.

Customers can view reports and network history via the 1stView portal.



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VeriSign unveils managed DNS service

BY CAROLYN DUFFY MARSAN

MOUNTAIN VIEW, CALIF. — VeriSign, the 800-pound gorilla in the Internet's DNS, has announced a service for companies that want to outsource DNS server management. However, VeriSign faces several upstart competitors that offer top-notch performance guarantees at lower rates.

VeriSign operates the central registry for domain names ending in .com, .net and .org, and runs domain name servers at 12 data centers around the globe. VeriSign's new managed DNS service will operate from the same data centers. The company promises fast, reliable resolution of domain name queries and a service-level agreement that guarantees 100% uptime.

Network managers typically operate their own DNS servers, a process that requires manually updating domain name zone data several times a day. Network managers update DNS data when they add domain names, upgrade servers and conduct maintenance.The DNS translates domain names to IP addresses and back, and it is a critical service for accessing e-mail and Web sites.

With VeriSign's Secondary Name Server Hosting Service, network managers retain control over zone data, but VeriSign handles distribution of zone data changes across the Internet. For an added fee, VeriSign offers e-mail alerts and reports to let customers know when errors are found in their zone data. VeriSign offers real-time statistics about zone data.

> ***"It makes perfect sense to outsource your DNS, but it's crazy to spend more than $50,000 a year on it."***

Paul Hoffman, director, Internet Mail Consortium

"We see bad zone data all the time," says Cricket Liu, director of DNS product management at VeriSign. "We estimate that 75% to 80% of the Fortune 500 have some bad data in their zone that could cause configuration problems."

VeriSign charges hefty fees for the hosting service. Basic service at two sites starts at $50,000 a year, but a typical company would pay $300,000 for the high-end service running at four VeriSign sites. VeriSign has not yet lined up any customers.

However, VeriSign faces several competitors, such as:

- UltraDNS, which has been selling outsourced DNS services since last August and has 220 customers, including K-Mart, Hewlett-Packard and Pacific Bell, uses proprietary technology instead of the BIND software that runs on most of the world's DNS servers, including VeriSign's.
- Nominum, which created BIND and launched its Global Name Service in February, provides support for emerging technologies such as the DNS Security extensions, which prevent hijacking of domain names, as well as IPv6 — an upgrade to the Internet's main communications protocol.

Industry observers say the success of these rivals may turn on pricing.

"It makes perfect sense to outsource your DNS, but it's crazy to spend more than $50,000 a year on it," says Paul Hoffman, director of the Internet Mail Consortium. "Microsoft had the most public DNS failure in the universe recently, and their stock didn't go down."

VeriSign: www.verisign.com

Hosting firm to put intrusion detection to the test

Verado to deploy Recourse Technologies' intrusion-detection gear.

BY ELLEN MESSMER

DENVER — Application-hosting services provider Verado is readying a rollout of intrusion-detection technology to provide a new line of defense against hackers and denial-of-service attacks that might compromise its customers' business servers.

Verado, which operates eight data centers around the country, claims to be investing in the range of "seven figures" in systems administration, software and equipment to launch Recourse Technologies' ManHunt and ManTrap intrusion-detection software. ManHunt detects and analyzes attacks, while ManTrap is a deception system — commonly called a honeypot — that emulates a typical server but is actually a decoy to keep hackers preoccupied while the intended victim gathers information on the attacker.

"The Recourse Technologies honeypot will be a kind of academic environment for us to learn more about how attacks are being perpetrated," says Regan Packer, director of logical security at Verado.

ManTrap and ManHunt, both based on Solaris servers, are designed to work together. ManTrap is a nonpublicized server that can emulate different devices, such as DNS, FTP, e-mail or Web servers. When ManTrap senses possible hacker activity, it communicates with ManHunt, which can track the hacker's activity through correlation of events.

Packer says Verado expects to have Recourse's software fully deployed within a few months. ManHunt has only been available for two months, while ManTrap shipped in late 1999.

As a service provider, Verado is working closely with its customers to ensure the intrusion-detection system meets their needs. One such customer is Cactus Strategies, a market analysis firm in Denver that counsels corporations on product, audience and investment strategies. Cactus maintains a large Oracle database at Verado's hosting center.

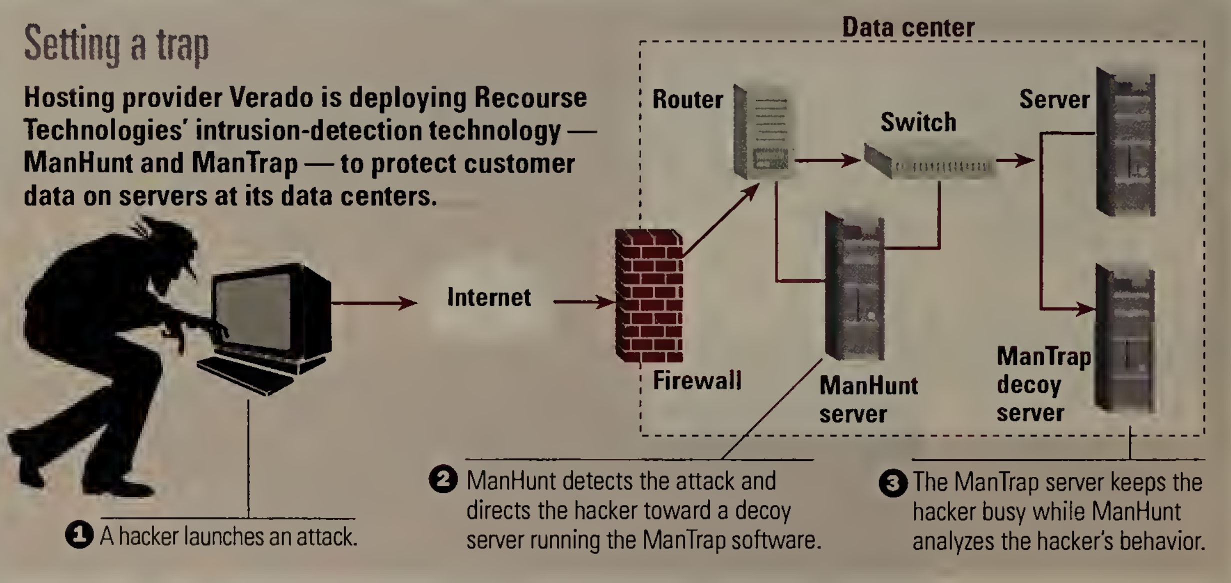
"We have customer lists of our clients in that database, and other information that belongs to others," says Carl Covine, CEO of Cactus. "It's very important to us to make sure none of that data is compromised."

Covine says he's "uncomfortable" relying only on a firewall as barrier to the Internet against hackers. Currently, only Cactus' employees are allowed access to the Oracle database housed at Verado via the Internet. But after Verado adds intrusion-detection capabilities, Cactus plans to let trading partners and clients access the database over the Internet.

One issue still in discussion among service providers is whether to charge for more advanced intrusion-detection services.

John Harper, CTO at Verado, says his firm will likely offer ManHunt and ManTrap as dedicated services with round-the-clock monitoring.There's likely to be a fee for this, but the exact cost hasn't been determined, he adds.

"I'd like to see the fees as low as possible, of course," Covine says. But to get the kind of security protection that's envisioned, he says he'll accept that separate costs are likely going to be part of it. ◪



Setting a trap

Hosting provider Verado is deploying Recourse Technologies' intrusion-detection technology — ManHunt and ManTrap — to protect customer data on servers at its data centers.

❶ A hacker launches an attack.

❷ ManHunt detects the attack and directs the hacker toward a decoy server running the ManTrap software.

❸ The ManTrap server keeps the hacker busy while ManHunt analyzes the hacker's behavior.

Correction

The column, "Telco's Greatest Hits Vol.1 and 2: Corporate theme songs," (March 12, page 55) used the incorrect picture for columnists Daniel Briere and Beth Gage.

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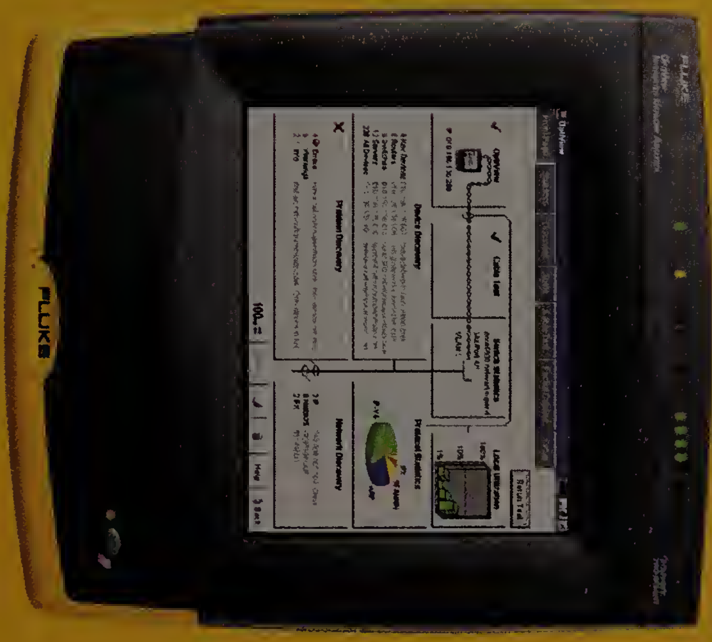

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IN-SITE: *Lessons from Leading Users*

Sears revamps in-store wireless LANs

BY JOHN COX

Given the benefits Sears has already reaped from the proprietary wireless LANs it's used in its stores since the mid-1990s, the retailer figures it's in for an even bigger payoff from the new standards-based LANs it will finish rolling out next month.

The company is wrapping up deployment of 15,000 handheld computers on IEEE 802.11b-based wireless LANs in 900 stores. Sears plans to use the devices for an array of new applications for shoppers, on top of the existing crop of inventory and pricing applications now used by employees.

The sleek, new Palm OS-based computers, built by Symbol Technologies, replace bulkier batch-oriented devices, worn in holsters, that reflected the proprietary nature of wireless networks before the advent of 802.11 wireless standards in the past few years. The new 2.4-GHz frequency-hopping radio-based LANs run at 1M or 2M bit/sec, not much faster than the outgoing wireless LANs.

But by adding easily programmable handhelds that use an operating system for which more than 7,000 applications are available, Sears plans to roll out a new generation of easy-to-use programs to streamline store operations and improve customer service, says Michael LeRoy, Sears' director of retail systems.

The original proprietary wireless LANs and handhelds already let Sears employees check prices and inventory without leaving the sales floor and provide limited, on-the-spot printouts of data. The systems improved pricing accuracy, reduced the time shelves were empty, shortened the time customers waited for merchandise pickup and sped merchandise movement from backroom to sales floor.

The new LANs and handhelds will let Sears streamline these processes further, improving the accuracy of bar code scanning and laying the foundation for applications intended to be used by customers.

> ***"One of my managers said, 'Footsteps are evil.' When you don't have to walk back to a PC to get your information, that's so important."***

Michael LeRoy, director of retail systems, Sears

For store employees, the new devices, dubbed "gizmos," are lighter, easier and just more fun to use than the old ones.

Users now work with a Web browser on the devices, instead of an alphanumeric interface, for accessing applications on an in-store server.

The Symbol handhelds also can work with a broader range of peripherals than the older devices, and these peripherals can be attached to a wireless LAN via radio interface cards. Sears is scattering Zebra Encore 3 network printers, fitted with Symbol wireless cards, around each store to handle printing a range of stock lists, pricing tickets and the like.

"One of my managers said, 'Footsteps are evil,' " LeRoy says. "When you don't have to walk back to a PC to get your information, that's so important."

When Sears first deployed in-store wireless LANs, the company required its vendor to make it possible to upgrade to 802.11b by changing the firmware in the radio access points and rolling out new handhelds. Sears was eager to embrace an IEEE standard for wireless so it could keep adding new equipment to its wireless networks, just as companies do on standard wired Ethernet LANs.

The next step was deploying an updated handheld with a new user interface.

"Ergonomics and total cost of ownership were the two key reasons for choosing a Palm OS-based device," LeRoy says.

Symbol's Palm OS browser meant that applications could be moved from the device — where they resided in the past — to centrally managed servers.

Symbol paid close attention in designing the SPT 1740 devices. Engineers incorporated a powerful bar code scanner, and configured the size and location of additional buttons for easy use. The handhelds are 1-inch high, 3 5/8 inches wide, 7 inches long and weigh 11.8 ounces, including battery and wireless card.

The new Sears devices also contain an SNMP agent that makes them visible to the firm's Hewlett-Packard OpenView net management software. The older devices could not be managed this way.

Sears says its employees are embracing the new devices.

"We made the mistake of passing the new gizmos out during our first training session, before we started talking about them," recalls Randy Blackburn, manager of a Las Vegas Sears store that's one of about a half dozen stores designated as "learning centers" for new systems. "There was instant chaos: It's like playing [instead of computing]. We almost had to take the gizmos back to get on with the training."

Not that much training was needed. LeRoy soon scrapped the 90-minute classroom-like sessions and created a set of 10-minute training films, one for each application. "Visual devices need visual training," he says.

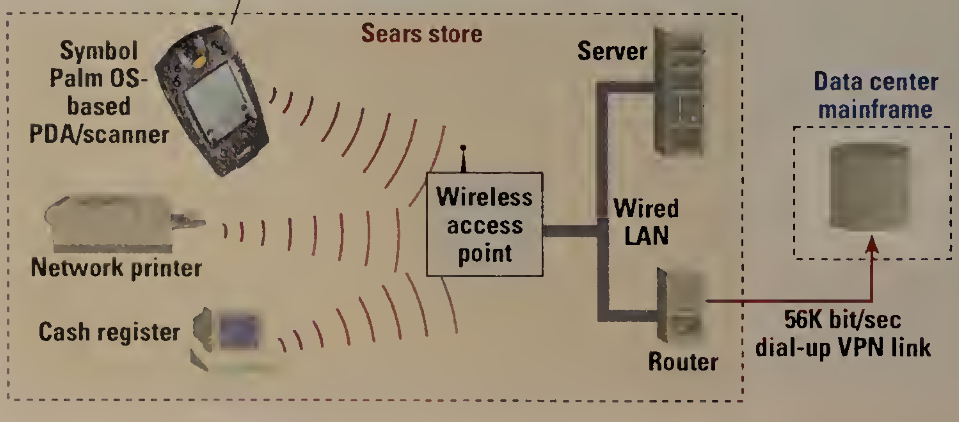
The new systems translate into more face-to-face time with customers.

"We'll put on this device whatever applications our customers demand," he says. ◪

Sears' new look

The retailer plans to roll out 15,000 Palm OS handhelds on 802.11b wireless LANs.

The new devices use a browser to check in-store pricing data and host-based inventory.



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Briefs

NetPro Computing is expected to announce this week at Novell's BrainShare user conference that it has enhanced its NDS eDirectory management package. DS Expert 3.2 includes Web-based alert logs and an alert "mute" function. The Web-based alert log lets administrators verify the status of their directories' health from any location. The alert muting feature lets administrators ignore an alert for a specific amount of time and prioritize alerts, enabling them to respond to out-of-order conditions. DS Expert constantly monitors the directory and alerts net managers of problems to ensure NDS eDirectory issues don't escalate into networkwide issues. It checks time and replication synchronization, flagging possible trouble. DS Expert 3.2 costs $12 per managed NDS user object.

NetPro: www.netpro.com

IBM and **Hitachi** last week formed a relationship to develop and manufacture servers, including IBM's upcoming AIX 5L server line, semiconductors and related components.

IBM and Hitachi will collaborate on developing chips to support Hitachi's VOS (virtual operating system). Financial terms of the agreement were not disclosed.

IBM has been readying its next-generation Unix, AIX 5L, for an April release, and the agreement between Hitachi and IBM will in part focus on "investigating additional opportunities" for PowerPC-based AIX 5L servers, the companies say. Hitachi agreed to add PowerPC-based servers to its product line and will sell AIX 5L servers under the Hitachi brand name, the companies say. Components to be jointly produced include memory cache components and multichip ceramic modules.

IBM: www.ibm.com; Hitachi: www.global.hitachi.com

Time heals 3Com user wounds

A year later, some users have stuck with 3Com despite its departure from the large chassis switch business.

BY PHIL HOCHMUTH

When 3Com quit its enterprise chassis-based switching businesses a year ago, a loud, common cry was heard from the company's large user community: "What do we do now?"

Since the announcement, many users have abandoned 3Com as a result, either in part or entirely. Others who bought new chassis switches from 3Com at the time have elected to stick with the discontinued products for as long as they last.

At the time, 3Com said it ended its large switch product lines because they were not generating enough revenue. The company said it wanted to pursue "high-growth" markets such as consumer and small- to midsize-business network products, as well as wireless LAN and service provider markets.

Although 3Com is out of the chassis switching business, it still managed to post 22% growth in the quarter with sales of its stackable switching products, according to research firm Dell'Oro Group. Cisco and Nortel — once 3Com's bitter rivals in the large enterprise switch market — have experienced revenue slowdowns, but both companies are still on top of the market, holding the No. 1 and No. 2 spots, respectively.

3Com has had no easy time of it the past year, either. The company recently announced it will cut 1,200 jobs, or about 10% of its workforce. It issued a warning that revenue would fall short by about $100 million for the third fiscal quarter, which ended March 2. After its announcement, the company's stock fell 17%.

Last year many network professionals first read in *Network World* about 3Com's decision to discontinue its CoreBuilder, PathBuilder and NetBuilder switch lines.

See **3Com**, page 20

www.nwfusion.com

SWITCHING SURPRISE

For the latest 3Com news and financials, and a look at reader reaction to the discontinuation of the company's high-end enterprise switches, check out our vendor profile online.

DocFinder 3425

find it online

Proxim lawsuit may boost wireless LAN costs

BY JOHN COX

Proxim sues over wireless LAN patents

Proxim sued six IEEE 802.11b wireless LAN vendors, alleging their products use techniques covered by Proxim patents. Here are the details of the lawsuit:

Who got sued:	3Com, Cisco, Intersil, SMC Networks, Symbol Technologies, Wayport
What the patents cover:	**#5077753:** Describes a direct sequence wireless LAN that delivers good performance at 1.0 and 2.0 M bit/sec. **#5809060:** Describes a way to achieve 5.5M bit/sec throughput from a direct sequence LAN device. **#6075812:** A way to achieve 11M bit/sec on a similar device.
What Proxim wants:	In the lawsuit, damages and an injunction; in a proposed licensing plan, license revenues from the likes of Cisco and 3Com.
What's at stake:	Some short-term uncertainty about the future of these products; licensing plan would likely boost costs of 802.11 wireless LANs that use direct sequencing modulation.

SUNNYVALE, CALIF. — There's a good chance that Proxim's patent lawsuit against a half-dozen wireless LAN vendors will pass without much of an effect on enterprise net customers, except somewhat higher equipment prices.

But that all depends on whether those vendors, which include Cisco and 3Com, challenge the validity of the patents, according to an analyst who has testified as an expert witness in other patent cases.

"We don't see this causing potential customers any heartburn," says Craig Matthias, a principal with Farpoint Group, an advisory firm specializing in wireless technology. The worst case, he predicts, could be a slight jump in prices if the vendors start paying Proxim a royalty for the intellectual property protected by the patents and pass on the cost to customers.

But that may not happen quickly. Matthias says a common strategy by companies charged with patent violations is to file countersuits challenging the validity of the patents. Sometimes, this is based on valid technical or legal grounds. In other cases, it's a ploy to negotiate a lower royalty fee. None of the vendors has responded to the lawsuit. A spokesman for one of the vendors, Symbol Technologies, says the company will not comment until its attorneys review the lawsuit.

Proxim roiled the airwaves earlier this month by filing federal lawsuits against a group of companies, charging them with infringing on key wireless patents (see graphic). Proxim has asked for an injunction from the International Trade Commission, targeting several foreign companies selling their products in the U.S. market. So far, that hasn't happened. The process could take more than a year.

Proxim CEO David King warned analysts that the company will take a $2.5 million charge for legal retainers and expenses in an effort to enforce the patents. The patents cover technology used in the fast-growing market for wireless LANs based on the IEEE 802.11b standard. A range of companies — including longtime niche players, such as

See **Proxim**, page 20

PROFIT FROM INTELLIGENT BANDWIDTH? BEWARE THE DEVIO

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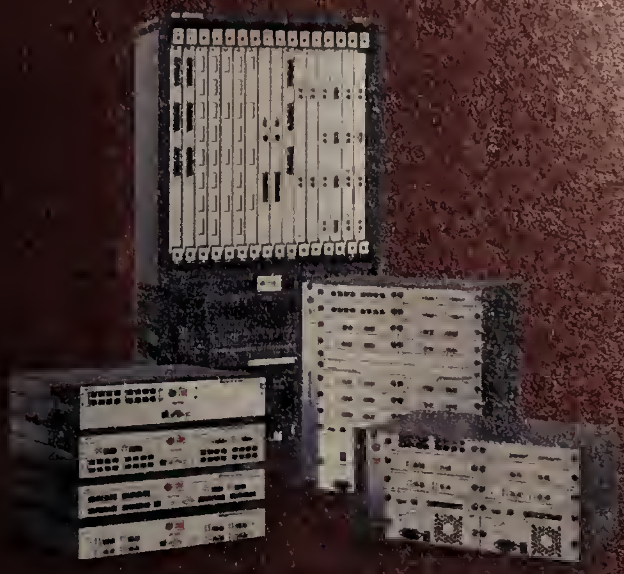

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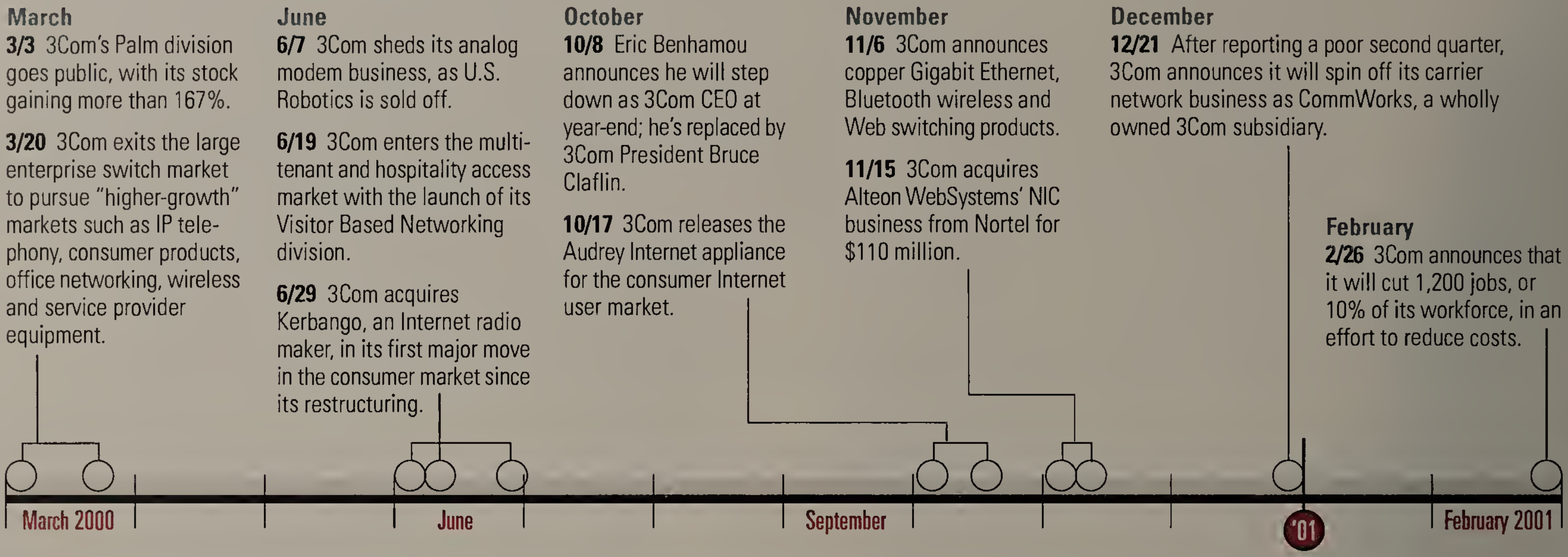
3Com's ups and downs

The past year was a rocky one for 3Com.



March

3/3 3Com's Palm division goes public, with its stock gaining more than 167%.

3/20 3Com exits the large enterprise switch market to pursue "higher-growth" markets such as IP telephony, consumer products, office networking, wireless and service provider equipment.

June

6/7 3Com sheds its analog modem business, as U.S. Robotics is sold off.

6/19 3Com enters the multi-tenant and hospitality access market with the launch of its Visitor Based Networking division.

6/29 3Com acquires Kerbango, an Internet radio maker, in its first major move in the consumer market since its restructuring.

October

10/8 Eric Benhamou announces he will step down as 3Com CEO at year-end; he's replaced by 3Com President Bruce Claflin.

10/17 3Com releases the Audrey Internet appliance for the consumer Internet user market.

November

11/6 3Com announces copper Gigabit Ethernet, Bluetooth wireless and Web switching products.

11/15 3Com acquires Alteon WebSystems' NIC business from Nortel for $110 million.

December

12/21 After reporting a poor second quarter, 3Com announces it will spin off its carrier network business as CommWorks, a wholly owned 3Com subsidiary.

February

2/26 3Com announces that it will cut 1,200 jobs, or 10% of its workforce, in an effort to reduce costs.

3Com,

continued from page 17

The reaction was not positive, as evident from an active Network World Fusion online forum at the time:

"It is always nice to get screwed by a manufacturer," wrote Dale Strawford, a technical support specialist for the city of Regina in Saskatchewan, Canada.

"This appears to leave all of us who have invested heavily into the 3Com CoreBuilder strategy on very shaky ground," wrote George Stapp, a network professional for a Florida public school district.

For Tony Crognale, a network technician for Scottsdale Insurance, the 3Com news came at the worst time. His company had just finished upgrading his 18 CoreBuilder 9000 switches from ATM to Gigabit Ethernet as part of a project to make Scottsdale a paperless office.

"When we had upgraded the [CoreBuilder] 9000s, we anticipated that 3Com would be in this business for a long time," Crognale says. "It wasn't but 30 to 60 days after we switched over from ATM that 3Com announced their plans. This threw a wrench in the works because we had long-term Layer 3 [Gigabit Ethernet] plans with 3Com."

Widener University's Gary Habermann swapped all of his 3Com equipment for Nortel switches.

With a complete ATM-to-Gigabit Ethernet upgrade already done, Crognale says, there was pressure from the company's management to find a vendor that would not burn the company again.

"We were about to do our second complete technology swap-out in one year," he says. "We didn't have any room for failure anymore. The upper management level told us, 'This stuff better work, and it better be there for a while.'"

Crognale's firm went with Extreme Networks' BlackDiamond switch to replace its CoreBuilder infrastructure instead of going with larger vendors, partly because Extreme was listed by 3Com as a partner for migrating off the CoreBuilder platform.

Crognale says his company was worried about Extreme's small size as a company at the time. The potential that the 5-year-old networking company would be bought out, thus causing more product line disruptions, was another fear he had.

Once the Extreme network was up, though, Crognale says he found the company to be strong on support, and the numbers on his network proved it was a good choice.

"On the 3Com boxes, the reporting logs showed utilizations for our 9000s to be from 30% to 50%" of the switches' total capacity, he says. "With Extreme, we're below 10%."

While Crognale overhauled his company's backbone, he still uses some 3Com products, such as a PathBuilder WAN router.

Other users say they needed to purge 3Com completely from their nets after the company's restructuring announcement last March. One such user was Widener University's director of network operations, Gary Habermann (www.nwfusion.com, DocFinder: 3424). The Chester, Pa., college, which also runs the network for the local Delaware County government, was a large 3Com shop, with CoreBuilders running ATM and Layer 3 Ethernet, as well as 3Com's NBX voice-over-IP system.

Habermann was disturbed by the 3Com equipment pullout. This is evident from his decision to throw out all the school's 3Com gear, including its SuperStack workgroup boxes, which are still active 3Com products.

Widener and Delaware County began installing an end-to-end network with Nortel Networks last August, bringing in 30 Passport 8100 and 8600 backbone switches, along with 400 BayStack 460 workgroup switches to replace the SuperStacks. He is looking at replacing his NBX voice-over-IP system. Habermann's move shows that 3Com hurt its other product lines when it decided to end its core switching business.

While users such as Habermann and Scottsdale Insurance's Crognale decided to ditch most, if not all, of their 3Com equipment, the city of Regina's Strawford decided to stick with the company, in spite of his disappointment.

"We found ourselves in the unenviable position of having spent significant [capital] on products that 3Com pulled the rug out from under," Strawford says.

He elected to stay with 3Com because the company said it would honor its service and support contracts on the city's CoreBuilder 9000 and four CoreBuilder 3500s.

"We are a 3Com shop and have had very few issues with their equipment. There was determined to be no value in the replacement or upgrade of this hardware," he says. Additionally, Strawford did not buy into 3Com's partnership with Extreme for a migration plan.

"3Com was offering a migration to Extreme Networks; We were not prepared to switch over at that time to what was, to us, an unknown commodity," Strawford says.

Though he felt jilted at first, Strawford is resigned to ride out the next three years with the discontinued gear. When those three years are up, who knows what company will step in to replace 3Com, he says.

"The way things are going in the industry," Strawford says, in three years "the choice of a new vendor might be made quite easy at that point if there are only a couple of vendors left standing."◪

Proxim,

continued from page 17

Proxim and Symbol, and network giants, such as Cisco and 3Com — are marketing wireless LANs that have throughput of 11M bit/sec and use what's called direct sequencing, which the Proxim patents address, to spread the transmitted signal over a wider bandwidth.

Direct sequencing is a way to spread the radio signal over a broad frequency range, which lets the radio technology support a large number of transmissions over a given range of frequencies.

A different approach to this spread spectrum modulation is frequency hopping, which transmits short bursts of information over specific frequencies to minimize interference. Direct sequencing is the "technology of choice" for wireless today, Matthias says.

The Sunnyvale, Calif., company, with fiscal 2000 revenue of just $107 million, is trying to entice wireless LAN companies into a licensing plan: In exchange for royalties, the companies will be able to legally use the intellectual property Proxim claims is covered by its patents. Royalties are typically a percentage of the selling price of the product, Matthias says.

He estimates the Proxim percentage, when negotiated, will likely be in the single or low double digits.

King says the company has researched the issue of protecting its intellectual property for more than a year. As far back as 1996, he says, Proxim formally notified the IEEE 802.11 committee about the patents.

He denies Proxim was seeking to "double-tax" the chain of products — that is, reaping licensing fees from the device builders and then from the service providers using the devices.

"We'll break down the value chain to separate product royalties from service royalties," King says. "We'll have to work this out, or litigate this, with the various parties."

He declines to say how long he thought the process will take because the courts' actions are based on the availability of judges and court schedules.

Few companies prefer to battle the issues out in court, Matthias says. "It's costly to litigate these cases, and people usually prefer to settle out of court," Matthias says.

A few years ago, he says, Ericsson and Qualcomm were locked in a legal battle over Code Division Multiple Access wireless technology but eventually settled their differences out of court through a cross-licensing agreement.

Proxim: www.proxim.com

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Tolly on Technology . **Scott Hamilton**

IP TELEPHONY'S 'FIELD OF DREAMS'

From a technological standpoint, the journey from yesteryear's economy to today's, if not tomorrow's, is akin to returning from Dyersville, Iowa, to Jefferson City, Mo. Movie fans know Dyersville for its "Field of Dreams," while Jefferson City is the capital of the "Show Me" state. Technology and service providers whose successes are built on the "Field of Dreams" philosophy — "If you build it . . . they will come" — won't survive. But those who respond to market demands of "Show Me" will prosper.

This is a healthy change. It's the classic marketing difference between "technology push" and "market pull." The victims will be those who fall into the "technology push" quadrant. The traits of such victims are those who believe more is better, stressing the quantity of features over necessary functions. The victors, on the other hand, will address true market needs rather than perceived needs. Their battle will be won because they will demonstrate a product or technology whose total savings exceed its total cost-of-ownership.

Consider the messages we heard over the past years regarding the convergence of voice and data networks. Initially, during the "Old Economy," the drive for convergence was huge cost savings due to toll avoidance — the circumvention of carrier access charges and settlement fees. But then, about the same time yesteryear's economy produced a dot-com for every product and service imaginable, we witnessed and pocketed significant savings from the reduction of long-distance toll charges. As a result, the new market buzz for IP telephony was the potential for increased productivity resulting from a converged network. But this is a more difficult case to quantify and convey than toll avoidance. And so began the "Field of Dreams" message.

Instead of quantifying the savings in operations, administration and management costs of a unified voice and data network, many "technologists" played on the productivity hype surrounding new IP phones. Many of these phones come standard with a multitude of bells and whistles, and are capable of providing better than toll-quality voice. Such a feat is possible because IP phones can employ wideband coder/-decoders that are not restricted to the traditional telephony sampling rate (8 kHz) and resulting voice bandwidth (4 kHz). Rather than produce an IP phone priced somewhat higher than a conventional business phone, some vendors introduced phones that cost $500 or more. These were promoted as executive phones.

I can't justify the expense of such a phone. And I don't need better than toll quality, especially when it requires greater bandwidth and my WAN bandwidth is a precious commodity.

That is proof that the "If you build it . . ." philosophy just doesn't work in the IP telephony sector. Buyers will gravitate to IP telephony only when they get real answers, real proof to overhyped benefits promised about the nascent technology.

Hamilton is a senior vice president with Tolly Research. He guides the company's IP telephony research track. He can be reached at shamilton@tollyresearch.com.

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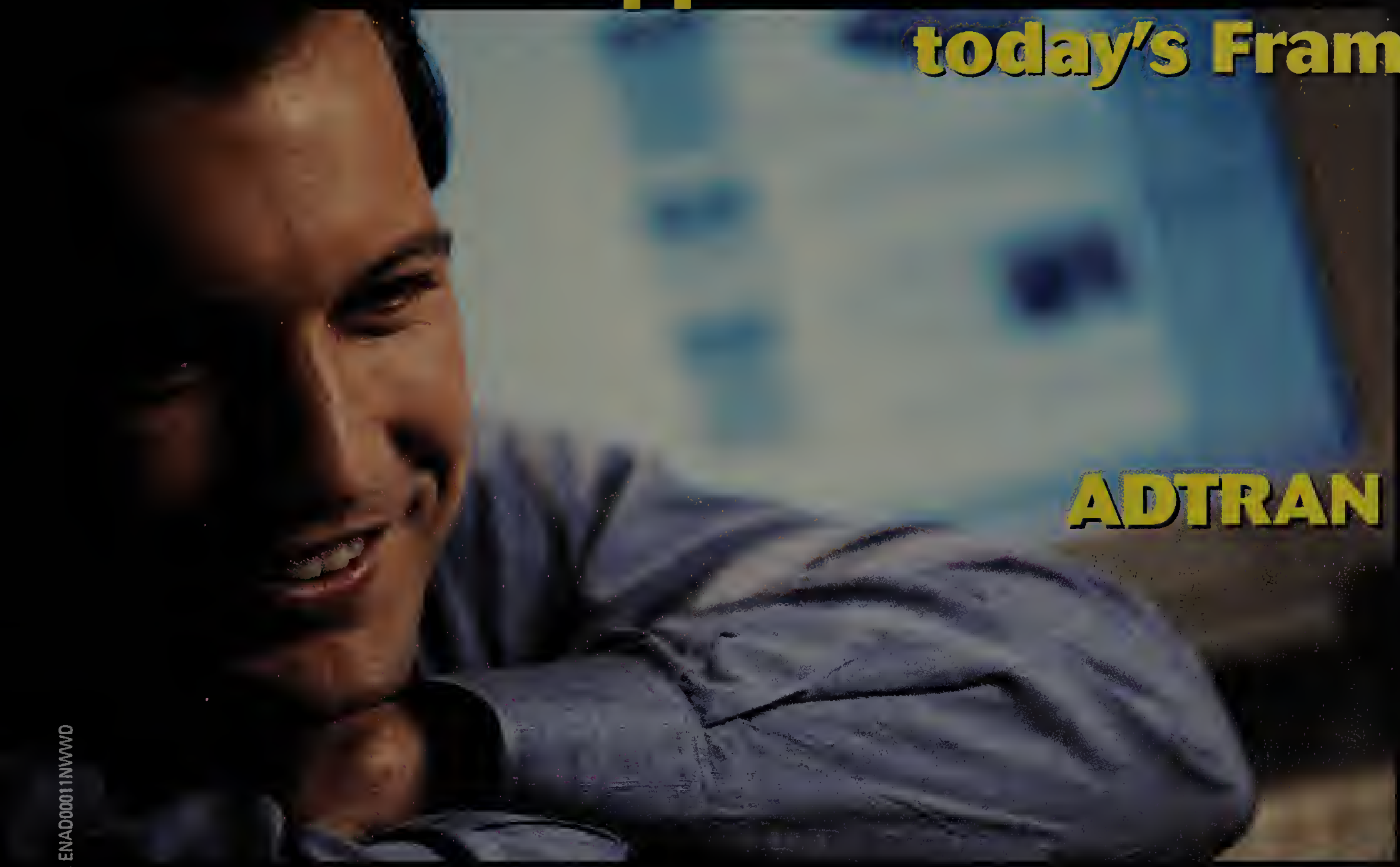

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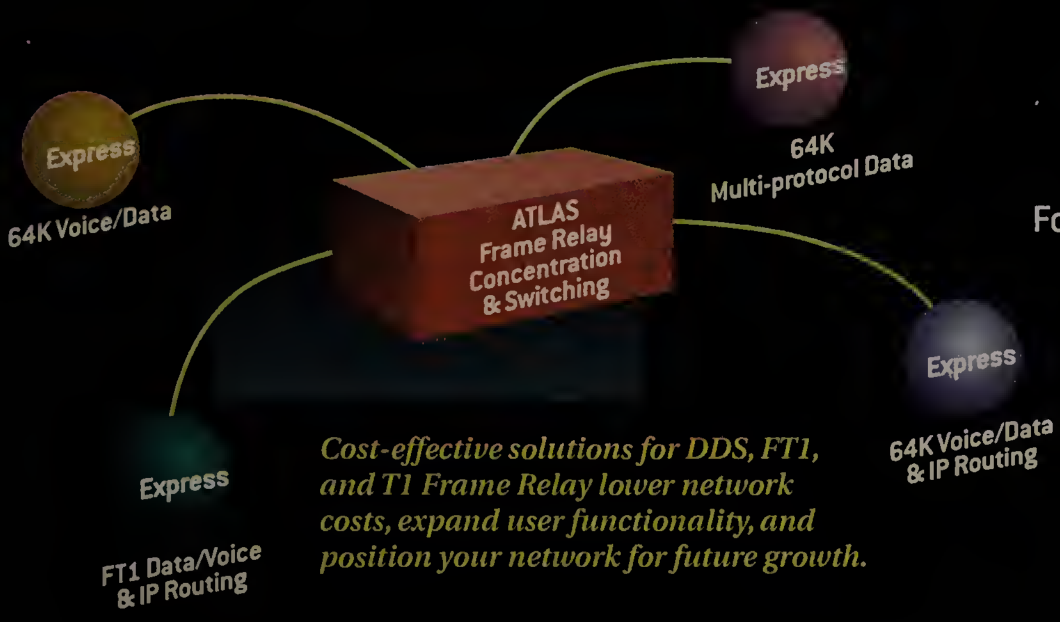
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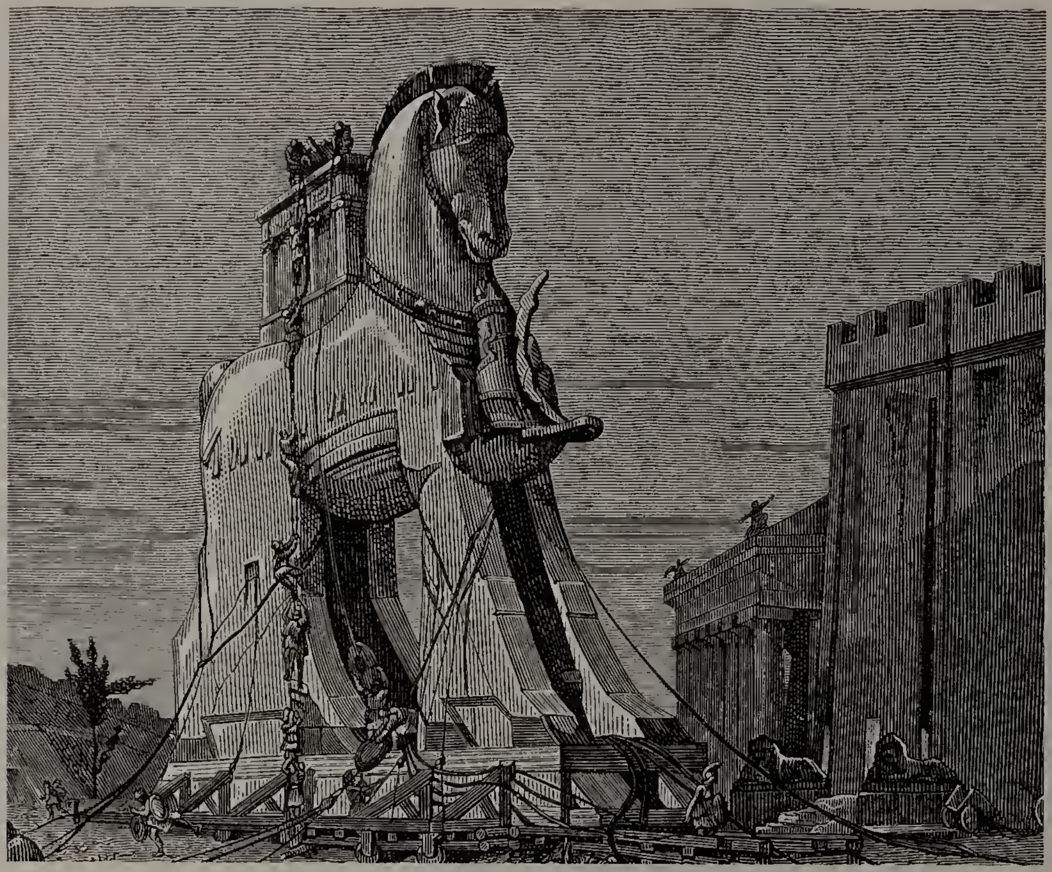

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Linux slips slowly into the enterprise realm

BY DENI CONNOR

LINUX UPDATE

Trusted for Web applications, resistance from CIOs lessens.

Linux and open source software are gaining in pilot projects, in-house customized development efforts and Web applications, where Linux has established a beachhead as a quick-to-implement, inexpensive alternative to proprietary operating systems.

Network professionals are using the Linux operating system to support Web and e-commerce applications and relying on programs such as Apache, Samba and the open source network management package BigBrother, or languages such as PHP: the Hypertext Preprocessor, because they are inexpensive and can be quickly deployed in situations in which an approved budget isn't available.

In addition, the big server vendors now support the Linux operating system in a big way. IBM, Compaq, Dell and Hewlett-Packard sell Linux preinstalled on Intel-based boxes and offer technical support for the operating system. Major enterprise software vendors, such as Oracle and SAP AG, have ported their premier database and enterprise resource planning (ERP) applications to the platform.

"Linux is already in the enterprise, being used within the system infrastructure," says Dan Kuznetsky, an analyst with market research firm IDC. "It's being brought in by system [administrators] who need to get a job done for the lowest possible cost."

Kuznetsky says Linux is usually running a Web server, database or messaging software, and "often the corporate IT department doesn't even know it's there. Linux is coming in [the back door] — the same way PCs did in the early '80s."

The truth about Linux and open source

Users of open source software and Linux often imagine perceptions that are much different than reality.

Perception	Reality
Support is nonexistent	IBM, Red Hat, SuSE, Caldera provide support for their products.
Support is a voluntary effort	Linux community is well-developed and actively supports products.
Feature development is willy-nilly	Applications are enhanced by the community as needed. Vendors determine which features they will add into their distributions.
Linux and open source apps are free	Although freely downloadable, users often pay for support, documentation and additional features such as installation programs.
Linux is unreliable and insecure	Linux has the same security features as other operating systems, such as Secure Sockets Layer and Open Secure Shell.

Resistance to Linux within the CIO's office, although waning, is still high. Evans Research Group numbers show nearly one-third of companies it surveyed did not look favorably on open source development last year. In 1999, almost one-half of those users said Linux development was forbidden in their companies.

Despite that, Linux had a 27% market share in 2000, according to IDC.

While IDC estimates that Linux and the xBSD operating systems (BSDi, NetBSD and BSD) will move into the No. 2 position behind Microsoft Windows by the end of 2004, Evans is more skeptical about its general use.

Based on a fall 2000 survey of Linux developers, Evans concluded that only 12.5% would use open source to build enterprisewide applications. The company's research indicated that developers' open source needs were focused elsewhere — 21% would use open source predominantly to create Web applications, and 19% would use it for small, ad hoc applications for their departments or workgroups.

Most users confirm that open source has netted them advantages they wouldn't have with proprietary operating systems or applications.

"We're using [Linux] to develop Web-based applications using PHP and MySQL," says J.E. Martin, technology coordinator for the nonprofit Educational Talent Search at the University of Arkansas in Fayetteville. "One of my projects is to make our student database available via MySQL and PHP instead of via Microsoft Access. Others [applications] are simpler things like online polls and contests." PHP is a HTML-embedded server-side scripting language.

Orlando Andaco, a system administrator and developer for Mosaic Communications, the first and largest ISP in the Philippines, has used open source to customize Web and messaging utilities and protocols.

"We've modified [Remote Authentication Dial-In User Service], [Post Office Protocol] 3 and the [Internet Message Access Protocol]," Andaco says.

That Linux would be used primarily for Web applications is no surprise, says NetCraft. The research firm shows that more than 58% of active Web sites run the freely downloadable Apache Web server. Microsoft's Internet Information Server follows with 19%, and Netscape's iPlanet server has a 6% market share.

As versions of enterprise applications such as databases, customer relationship management and ERP applications become available on Linux from vendors such as Oracle, SAP and IBM, CIO resistance to Linux is shrinking, IDC's Kuznetsky says.

He says Linux is showing up in healthcare, finance, banking and retail where identical sites and servers are being built.

"They build it once and then chop it up and distribute it," Kuznetsky says. "If you were doing this for 2,000 sites using SCO UnixWare at $4,500 per license, it would cost $9 million for just the system software." He says Windows would cost $8 million, but with Linux a user can get off for $180 if they buy Red Hat Linux. And they can replicate it as many times as they want.

While IT managers say they typically use Linux and open source tools for first- and second-tier Web applications and replicated sites, they see little hope it will ever replace a back-end Oracle database. At least, not just yet.

"We had a bad experience [with] data corruption [and] bad concurrency with MySQL, and my boss has gotten really allergic to open source databases," Andaco says. "In any case, Oracle works fine, so we're not fixing what isn't broken."

Of all companies, IBM has been most vocal about introducing commercial-grade Linux server applications to organizations. IBM points to companies such as Grede Foundries, which has successfully installed Linux systems as front ends for IBM's System/390 mainframes.

"I've been using Linux for a little more than a year [as a pilot project]," says Rich Smrcina, data center manager for Grede in Milwaukee. "I was able to download source code off the Internet that was written for the Intel platform and compile it on Linux for System/390 and run it without any problems." He downloaded products such as the Apache Web server and Samba, a program that lets Linux look like a Windows NT server.

"I got Apache and Samba running in a couple of weeks," Smrcina says. "I wanted to use Samba to provide online manuals to our programming staff. Users didn't know the difference." He has four Linux servers attached to his S/390, and is running two DNS servers and BigBrother.

IBM's early success in Linux, its port of its DB2 database to Linux, and the amount of money the firm is throwing at the open source market may yet prompt recalcitrant CIOs to deploy Linux in greater numbers.

Support also appears to be a selling point for IT. CIOs aren't keen on depending on Usenet groups or ad hoc support efforts. IBM, Red Hat and Caldera realized this and instituted services and support programs that rival those available for proprietary software. IDC estimates that while the Linux support market is not large now — $56 million this year — it will grow to $285 million in 2004. ◪

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You think
your company's
online.
But it's not.

The bridge between the paper world and

Your investment in IT infrastructure is huge. And the impact of the Internet on your IT budget grows larger every day. You've poured tons of resources into ERP systems as well as e-mail and document workflow systems. How much? Well, studies show that as much as 50% of an average IT budget can be involved with managing documents.

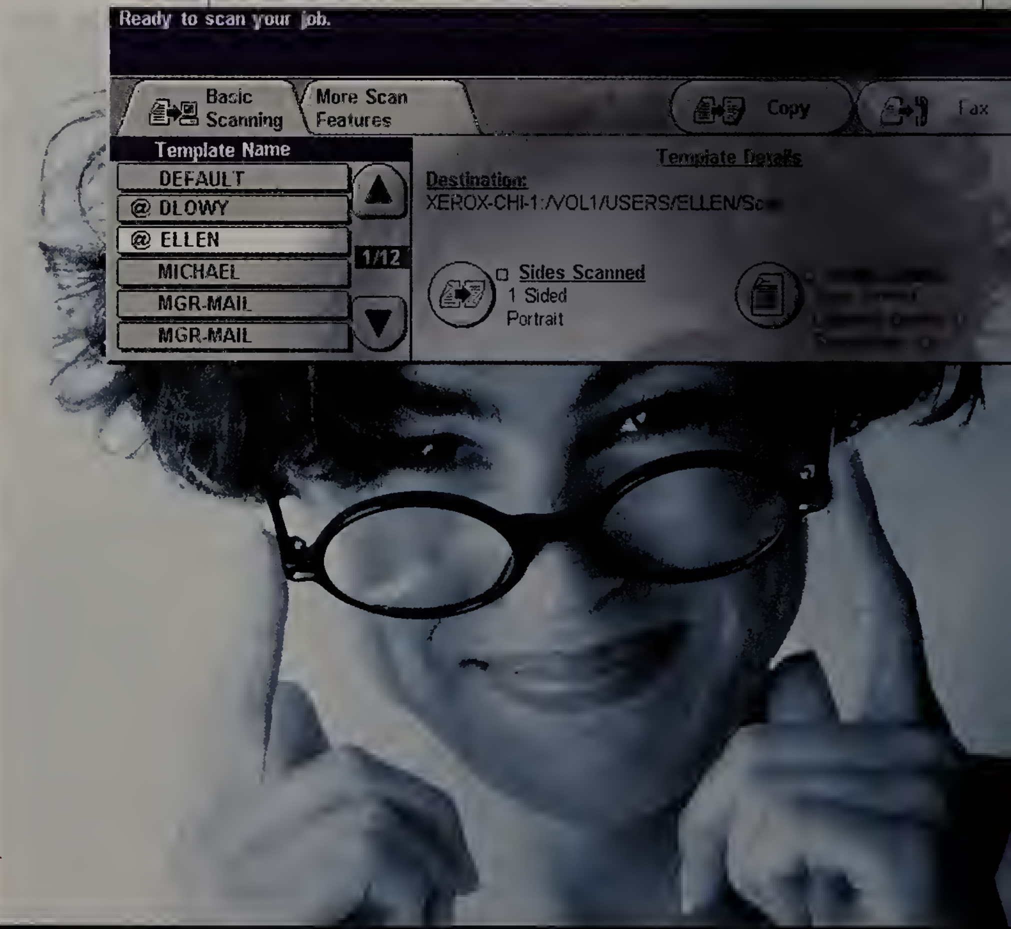
❑ True, there are more documents online than ever before. But it's also true that we are creating more paper documents than ever before: twice as many as just five years ago. The reason is simple: Most companies have lots of off-ramps that turn electronic documents into paper documents, but almost no one has lots of on-ramps capable of converting paper documents into electronic ones.

❑ In fact, giving you new ways to leverage your IT investment by bridging the frustrating gap between the paper world and the electronic world is exactly what the Xerox Document Centre system was designed to do.

❑ For starters, a Document Centre lets people work the way they are used to working—you can scan documents in the same place you print or copy them—it's that easy and that accessible. Of course, the Document Centre gives workgroups of 10 or more desktop control over everyday functions like printing, copying, PC faxing and finishing. What's more, by making document imaging an "everyday" function, the knowledge and information recorded in paper documents can now become a seamless part of the digital workflow.

It's about document imaging for every workgroup.

If scanning is on your radar at all, you probably see it as limited to environments with dedicated operators. And so it has been. But the Document Centre system is changing that in big ways.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Destination:
XEROX-CHI-1:/VOL1/USERS/ELLEN/Sc

☐ Sides Scanned
1 Sided
Portrait

the online world is now open for business.

Scan directly to the Web or virtually anywhere else you want to.

Going out to the hallway and scanning large documents into the digital stream at up to 65 ppm is certainly efficient, but the important question remains: Where is all that information going, and what can you do with it once it gets there?

☐ Document Centre lets you scan directly to industry-standard messaging and collaboration platforms like Microsoft Exchange, Lotus Notes or Domino.Doc.

Scan 65 ppm

3 easy steps

1 Select scan folder
2 Select destination
3 Press green button

☐ You can scan directly to a Web repository, so anyone has instant access to information from a remote location.

☐ Scan to your PC desktop, and with ScanSoft PaperPort and TextBridge software bundled with Document Centre, you can drag and drop your scanned image into any one of 150 industry-standard applications. You won't need to re-key your documents.

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Microsoft
Windows NT 4.0 & 2000
Appletalk
Novell NetWare 4.X
PCL 6
Token Ring 14/16MB
TCP/IP
OS/2 WarpServer
Ethernet 10/100
Adobe PostScript 3

☐ Or scan documents to the network, and using software like Xerox DocuShare, users can access them through any current Web browser on any platform. It gives you an electronic file cabinet that's a very efficient way to share knowledge and dramatically reduces e-mail traffic.

☐ Or combine Document Centre with Xerox FlowPort. FlowPort is a Web-based software platform that manages the flow of documents from paper to digital and back again in dramatically new ways. For example, FlowPort gives mobile workers the freedom to access and print any documents on the Web without using a PC.

☐ And when it comes to getting your digital documents back into paper form, Document Centre's open architecture supports all major industry printing standards and encourages third-party software solutions to thrive. So you can print not only from your desktop or from the Web, but also directly from your mainframe, including ERP applications like SAP.

☐ In short, things once limited to paper are electronically archived, accessed, shared and easily printed wherever you need them. It doesn't just increase productivity, it decreases costs and saves time. Turn the page to learn how one of our customers is already benefiting.

The Web
Microsoft Exchange Public Folders
Lotus Notes
Xerox DocuShare
Lotus Domino.Doc
PC Desktop

Paper or digital, it's about solutions that leverage the network.

We have hundreds of customers who report impressive results. But here's one in-depth story of how a Document Centre solution reduced one organization's work-cycle time from three days to just three minutes.

The Customer:

Center for Technology Management, in a prominent Midwestern research institute.

The Problem:

There are dozens of huge file cabinets overflowing with documents—patents, notes and contracts about inventions the university owns. Each year up to 1,500 new folders are added. Every day, dozens of people call and request files. By law, the university must provide public access to any of these thousands of complex scientific documents for reference, revision, notation or collaboration. And it must be done for 25 years. The commitment of time, space and personnel is large and growing.

The Solution:

Combine Xerox FlowPort and DocuShare with two Document Centres. This gives you a search engine for all your documents.

Now when people need a document, they just check off the file they need on a FlowPort cover sheet, scan it into the Document Centre, and FlowPort software finds and sends the requested electronic file to a server that can print, e-mail or store the document. What's more, once the file is stored, DocuShare lets you manage it on the Web, giving authorized users instant access for viewing, downloading and printing documents from anywhere at any time.

The Result:

A process that used to take three days can now be completed instantaneously. Documents are accessed and shared electronically. Paper is eliminated while collaborative work processes are made simpler. Security is improved. Those 20 file cabinets are soon history. Costs are lowered. Time is saved.

Online or off, it's about a simpler way to share knowledge.

In a world of intranets and extranets, of e-commerce and the Internet, you need state-of-the-art technology and expertise to manage and share the documents that contain the knowledge in your organization. The Xerox Document Centre is a digital platform engineered from the ground up to eliminate the barriers between your paper and online documents.

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Carriers & ISPs

The Internet, Extranets, Interexchange and Local Carriers, Wireless, Regulatory Affairs

Briefs

EarthLink earlier this month became the latest DSL provider to increase prices, raising its monthly service charge by $10 per month. EarthLink's DSL service now costs $49.95 per month. The company is waiving its $99 installation fee, although DSL subscribers must sign 12-month contracts. The company blamed the raise on the higher tariff rates it must pay to get lines from the incumbent local exchange carriers. **SBC Communications** was the first DSL provider to raise basic DSL prices, increasing its monthly fee $10 to $49.95 last month.

Qwest Communications introduced business-class DSL in Pittsburgh last week. The service, known as Qwest Integrated Business Solutions, provides Internet connections beginning at 256K bit/sec. In addition to Internet access, the service offers Web site design, hosting, LAN integration and long-distance offerings.

Qwest: www.qwest.com

Equinix is beefing up its Internet network exchange points, which the company calls Internet business exchange centers. The company has six exchange points that offer interconnection and server collocation services. Equinix doubled the capacity of its Chicago facility to support 68,000 additional square feet of space. Equinix now supports 611,000 square feet of space at six U.S. exchange points, with 140,000 square feet at the Chicago site alone.

Service providers such as Cable & Wireless, Digital Island, Excite@Home, IBM, InterNAP, Level 3 Communications, Qwest Communications and WorldCom's UUNET all interconnect at the Chicago site.

Equinix: www.equinix.com

WorldCom preps all-in-one call center

BY DENISE PAPPALARDO

WorldCom is developing a managed service that will let companies update traditional call centers by integrating a handful of communication platforms the company says will provide stronger customer service support.

WorldCom Web Center is a fully managed service that will integrate a user's customer relationship management (CRM) contact information with a transaction database server at one of the carrier's two data centers. This platform lets Web Center customers transform a telephone-only call center into an environment that can accept e-mail, text chat messages, telephone calls and faxes from consumers without adding new hardware or software at their site.

WorldCom isn't the first provider to come up with the all-in-one call center. Other service providers, such as Telera and Qwest Communications, are offering similar services today, says Mark Winther, group vice president of worldwide telecommunications at consulting firm IDC.

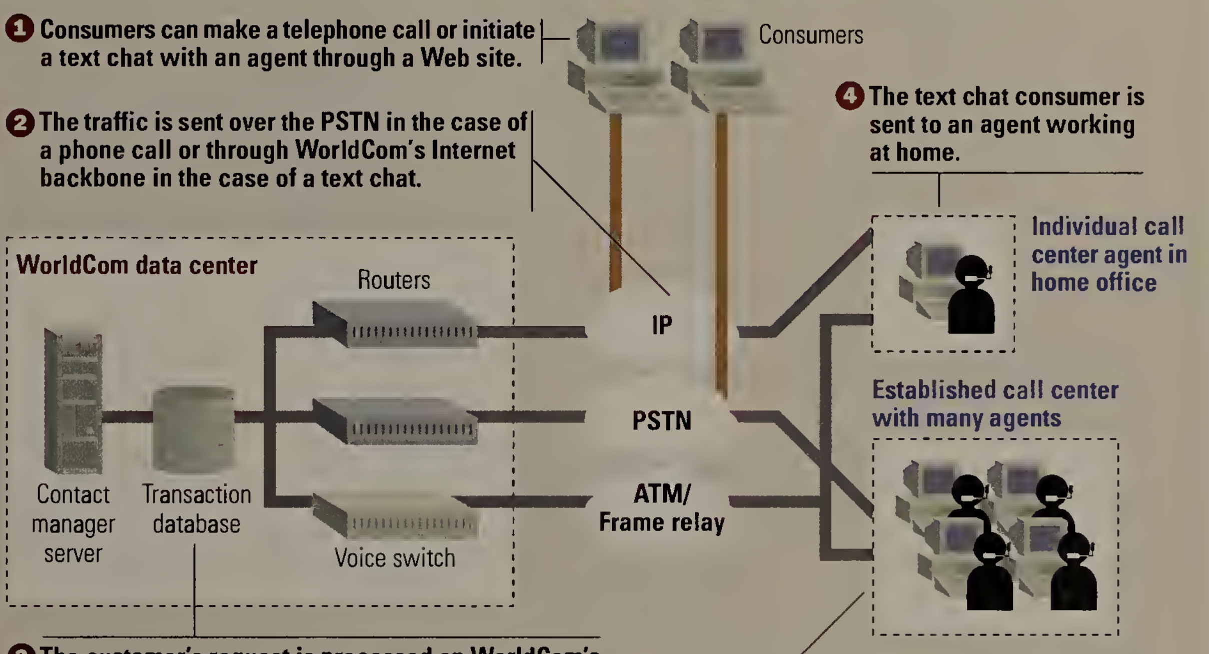
The smarts of the WorldCom service are hosted in centers in Ohio and Nebraska. At these sites the carrier is setting up Web Center servers and databases that will have direct connectivity to the company's ATM, frame relay, Internet and public switched telephone networks.

This lets large call centers with 50 to 1,000 agents and a frame relay or ATM connection use their existing network infrastructure. If a consumer is surfing a Web Center customer's Web site and they initiate a text chat with a service agent, that information is routed through the Internet to WorldCom's data center. The transaction database sends the information request to the contact manager server that knows where an agent is available and if they spe-

See **WorldCom**, page 31

WorldCom's future call center

WorldCom will offer businesses call centers that can support e-mail, telephone, fax or text chats with customers. These requests are funneled into the carrier's data center and processed on one system.



① Consumers can make a telephone call or initiate a text chat with an agent through a Web site.

② The traffic is sent over the PSTN in the case of a phone call or through WorldCom's Internet backbone in the case of a text chat.

③ The customer's request is processed on WorldCom's transaction database, which communicates with its contact manager server. The contact manager determines which agent can best address the customer's inquiry.

④ The text chat consumer is sent to an agent working at home.

⑤ The telephone consumer can be sent to a large call center where there are more agents available and agents may have dealt with this customer before.

Broadwing nearing completion of all-optical net

BY DENISE PAPPALARDO

AUSTIN, TEXAS — Broadwing Communications has nearly completed its all-optical nationwide network, which the firm expects will offer users fast provisioning intervals and lower-cost services.

The service provider announced last week that its second fiber-optic ring is up and running. It spans cities in the central states including Denver, Las Vegas, Salt Lake City and Kansas City, Mo. The three main rings in the core of its network will total 18,500 route fiber miles when complete.

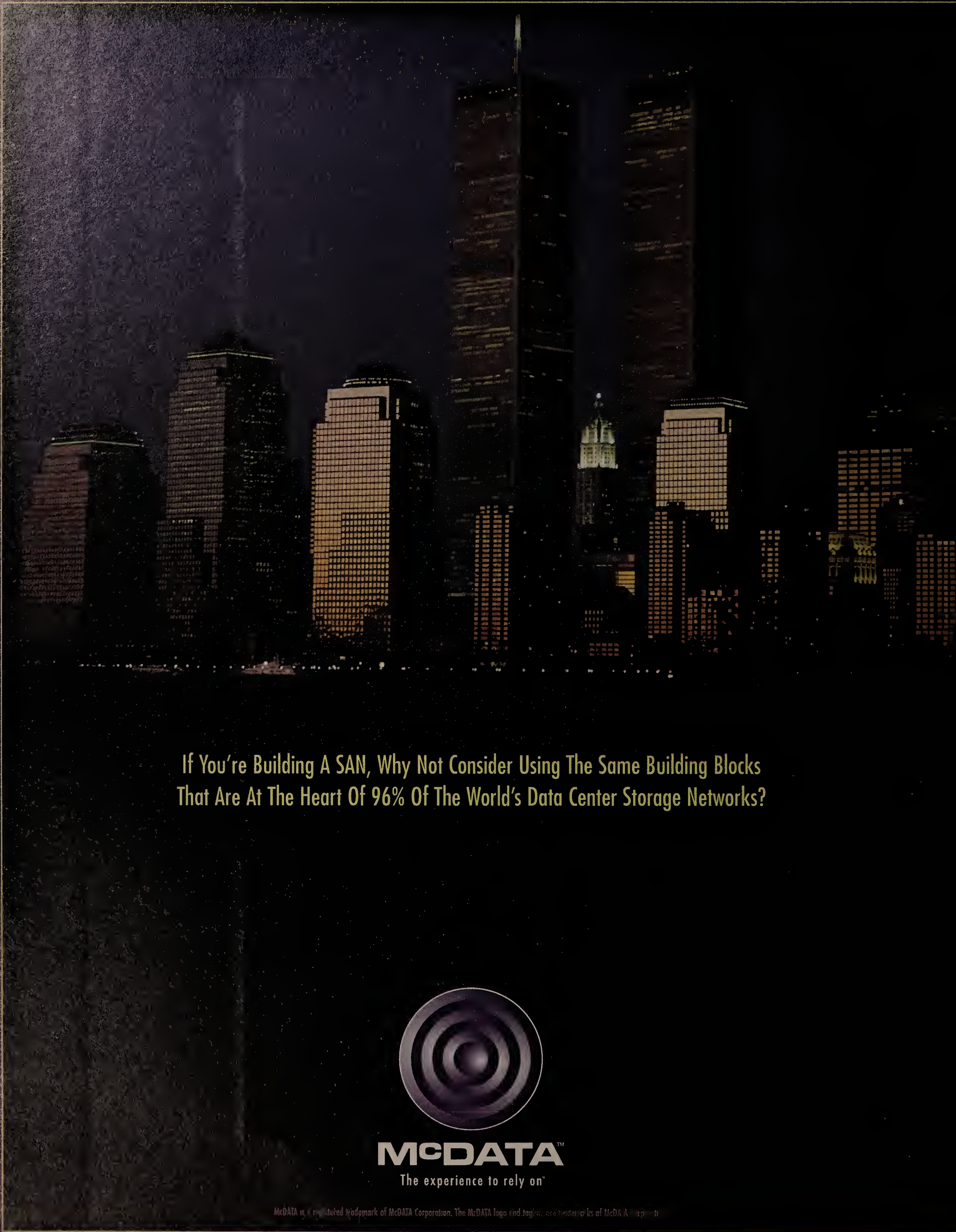
Broadwing is one of many national service providers including AT&T, Qwest Communications and WorldCom that is testing and deploying optical net gear.

Broadwing's final optical ring, spanning states in the West, will be operational by the end of the month, says Dale Richardson, director of transmission systems engineering. The eastern ring was finished earlier this month.

The firm deployed four Corvis MultiWave Core Director optical switches in its network to support a meshed architecture, Richardson says. The switch supports link restoration on the optical rings within 50 milliseconds and dynamic bandwidth allocation for partial wavelength services from 50M bit/sec up to 10G bit/sec.

At each optical switch, Broadwing has set up a minimum of three fiber routes to support what's called mesh restoration. It is using Cienna's optical digital cross-connect to support mesh restoration. Broadwing is also using long-haul dense wave division multiplexing (DWDM) throughout its network, which Richardson says offers more cost efficiencies. Typical DWDM systems need electrical regeneration every 300 to 500 kilometers. Long-haul DWDM requires electrical regeneration every 3,200 to 4,000 kilometers.

"Provisioning additional capacity across the network takes days instead of months," Richardson says. ◪



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Eye on the carriers . **David Rohde**

A FINAL FEW WORDS

As an IT journalist, I've always been amused by the way vendors issue press releases saying they're "proud" to announce something.

When I was a kid, I thought I heard that pride was a sin, not a virtue. I guess all five billion public relations people who've called me during my seven-plus years at *Network World* belong to the same nondenominational secular church.

All by way of explaining that I'm torn between pride and humility in using this week's column to announce my departure from *Network World* and a new career as an analyst with The Yankee Group.

In obtaining a new outpost for my blatherings, I lose another stage — the page you're reading — so I hope you'll indulge me as I look back over our time together.

With help from reader input, I'm pleased — oh, hell, I'm proud — that:

- I didn't fall into the trap of assuming that just because the regional Bell operating companies so often wear the black hat, everyone else in the telecom industry wears a white hat.
- I didn't generalize about new ventures in the carrier and ISP arena, pointing out through boom and bust which companies were really building a better mousetrap and which were just along for the ride.
- With a little goading from our friend Tom Nolle, I was able to show that so many legacy carrier services, even ones called IP or VPN this-or-that are really ATM.
- I helped to provide a user voice into the deliberations of the Federal Communications Commission, even when the user voice was sorely lacking or, worse, was being masqueraded by a vested interest group.
- I was able to bring you important "devil in the details" fine print from industry documents, whether they were price lists, bill surcharges, service-level agreements or the SBC Communications/Ameritech merger conditions.
- I never confused industry cliches such as "convergence," "seamlessness" or "one-stop shopping" for real user benefits such as greater capacity, lower prices, less latency, better network visibility or predictable customer service.
- I recognized that hybrid networks of some sort always have been and always may be a fact of life, whether it's Multi-protocol Label Switching-based IP VPNs, frame relay-to-ATM interworking, packet-over-SONET metropolitan rings or anything else.
- I showed you how completely politicized the telecom industry remains and how 90% of carrier lobbying in Washington, D.C. is defensive in nature, no matter how they portray it.
- I didn't assume that carriers and vendors are necessarily any better at managing networks than enterprise networking professionals.
- And finally, that unlike every other columnist in the entire computer trade press, I never once, until this sentence, used the phrase "Monica Lewinsky" to illustrate some point or another.

Folks, I've had a great time bringing you the straight scoop, and I treasure the time we've spent sharing ideas and learning. Keep the faith, everyone. ◪

WorldCom,
continued from page 29

cialize in the products the consumer is inquiring about. The text chat is then sent via the call center's ATM network to the appropriate agent.

Web Center customers can set up call center agents in home or small offices across the U.S. Agents in this setup will likely have a broadband connection to the 'Net, but the service can also be supported via a dial-up connection, says Frank Nigro, director of e-application product management at WorldCom.

In this scenario, the transaction database will route consumer telephone calls, faxes and text chats to individual agents just as if they were in a large call center. The contact manager tracks how long agents are online helping customers and logged on to accept customer inquiries, which lets management easily track employee performance.

WorldCom is supporting a click-to-call feature, which lets a consumer click a button on a Web site to receive a call back from an agent. The carrier is not supporting voice-over-IP calls where a customer can initiate a voice call from their PC over the Internet to an agent. "In the future we'll be able to support a complete IP-to-IP call," Nigro says. It's a quality-of-service issue today, he adds.

The carrier did not reveal any of the software or hardware partners it is working to develop the service. But this is an important piece of information for potential customers, IDC's Winther says.

"This is a powerful proposition that WorldCom is offering, but it has to work," Winther says. "There are a lot of pieces needed to make this work well together from speech recognition to CRM software, and a customer should know what they are getting."

WorldCom says beta customers have been selected, but they do not have the service up and running.

WorldCom says the service should be introduced this spring. Pricing has not been set. ◪

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B301

1. What is the principal business activity at your location?

(check ONE only)

01. ☐ Manufacturing (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities/Process Industries/Mining, Construction, Petroleum, Refining, Agriculture, Forestry
10. ☐ Education
11. ☐ Government/Military
12. ☐ Consulting (Independent) *
13. ☐ Communications Carriers
14. ☐ ISP
15. ☐ ASP
16. ☐ Manufacturing (Computer/Communications/OEM)
17. ☐ Resellers/VARs/VADs/Integrators/Distributors* (Computers/Communications)*
18. ☐ Other (please specify) ____________________

*Attn Consultants, Integrators, Distributors, Resellers: Please complete form based on ALL clients and your own business needs

2. P: What is your primary job function? (check ONE only)
S: What is your secondary job function? (check ALL that apply)

P S

☐ 1. ☐ Network Management
☐ 2. ☐ LAN Management
☐ 3. ☐ Datacom/Telecom Management
☐ 4. ☐ CIO/CTO/IS/IT/MIS/Systems Management
☐ 5. ☐ Internet/Intranet/E-Commerce Management
☐ 6. ☐ Engineering Management
☐ 7. ☐ Corporate Management (CEO, COO, CFO, Pres., VP, Dir., Mgr.)
☐ 8. ☐ Consultant (Independent)
☐ 9. ☐ Other (please specify) ____________________

3. What is the estimated value of Network equipment and services that you specify, recommend, or approve the purchase of?

(Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–O.)

1. $100 Million or more
2. $50 Million to $99.9 Million
3. $25 Million to $49.9 Million
4. $10 Million to $24.9 Million
5. $1 Million to $9.9 Million
6. $100,000 to $999,999
7. $50,000 to $99,999
8. Under $50,000
9. None of the above

A ____ Large Systems *(Mainframes/Minis)*
B ____ Desktops *(Micros/Laptops/ Workstations)*
C ____ Mobile *(including PDAs, Wireless)*
D ____ Servers
E ____ LANs
F ____ WAN Equipment
G ____ Carrier Services
H ____ Internetworking *(including Routers, Switches)*
I ____ Internet/Web/E-commerce
J ____ Intranet/Extranet
K ____ Remote Access
L ____ Peripherals
M ____ Software
N ____ Service/Support Services
O ____ Storage

4. What is the total number of sites for which you have purchase influence?

(check ONE only)

1. ☐ 100+
2. ☐ 50 to 99
3. ☐ 20 to 49
4. ☐ 10 to 19
5. ☐ 2 to 9
6. ☐ 1
7. ☐ None

5. What is the total number of Servers/Clients/LANs installed/planned at your location/in your entire organization?

(check ONE box in each column)

SERVERS			CLIENTS			LANs		
At Location A		Entire Org. B	At Location C		Entire Org. D	At Location E		Entire Org. F
☐	1. 50,000+	☐	☐	1. 50,000+	☐	☐	1. 50,000+	☐
☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐
☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐
☐	4. 100 to 999	☐	☐	4. 100 to 999	☐	☐	4. 100 to 999	☐
☐	5. 50 to 99	☐	☐	5. 50 to 99	☐	☐	5. 50 to 99	☐
☐	6. 10 to 49	☐	☐	6. 10 to 49	☐	☐	6. 10 to 49	☐
☐	7. 1 to 9	☐	☐	7. 1 to 9	☐	☐	7. 1 to 9	☐
☐	8. none	☐	☐	8. none	☐	☐	8. none	☐

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check ONE only)

CORPORATE:
1. ☐ Entire Enterprise/Multiple Enterprises
2. ☐ Division/Multiple Divisions
3. ☐ Department
4. ☐ None

B. Involvement (check ALL that apply)

1. ☐ Create Network/IT Strategy
2. ☐ Recommend/Specify Brand
3. ☐ Approve Purchase
4. ☐ Evaluate Products/Services
5. ☐ Determine the Need
6. ☐ None

7. What is the estimated number of employees at your location/in entire organization?

(check ONE in each section)

A. At your location:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 250 – 499
8. ☐ 100 – 249
9. ☐ 99 or less

B. Entire organization:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 499 or less

8. Please indicate the Internet/Intranet/WAN/LAN/Remote products/services that you are currently involved in purchasing or plan to purchase (check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

INTERNET/INTRANET

A B

☐ 01. ☐ VPN Equipment
☐ 02. ☐ VPN Services
☐ 03. ☐ Firewalls/Security/Encryption
☐ 04. ☐ Electronic Commerce Tools
☐ 05. ☐ Web Servers/Software
☐ 06. ☐ Internet Services
☐ 07. ☐ Web Hosting
☐ 08. ☐ Content Hosting
☐ 09. ☐ Traffic Management
☐ 10. ☐ Web Development Tools
☐ 11. ☐ Management/Monitoring Software
☐ 12. ☐ Web Based Management Tools
☐ 13. ☐ Web Based Collaboration/Groupware
☐ 14. ☐ Web Acceleration/Caching/Load Balancing Products
☐ 15. ☐ Other Internet/Intranet

LANs/INTERNETWORKING

A B

☐ 16. ☐ Local-Area Networks
☐ 17. ☐ Network Operating System Software (NOS)
☐ 18. ☐ Intel Based Servers
☐ 19. ☐ Intel Based Multiprocessor Servers
☐ 20. ☐ RISC Based Servers
☐ 21. ☐ Clustered Servers
☐ 22. ☐ Print Servers
☐ 23. ☐ Routers
☐ 24. ☐ Layer 2 Switches
☐ 25. ☐ Layer 3 Switches
☐ 26. ☐ Layer 4-7 Switches
☐ 27. ☐ ATM Switches
☐ 28. ☐ Token-Ring Switches
☐ 29. ☐ Network Storage (NAS, SANs)
☐ 30. ☐ Storage/Backup (Optical, Disk, Tape, RAID)
☐ 31. ☐ Network Test/Diagnostic Tools
☐ 32. ☐ UPS
☐ 33. ☐ Network Interface Cards (NICs, PCMCIA)
☐ 34. ☐ Hubs/Intelligent Hubs/Stackable Hubs
☐ 35. ☐ Cables,Connectors, Baluns
☐ 36. ☐ Management Frameworks
☐ 37. ☐ Call Center Tools
☐ 38. ☐ Voice over LAN
☐ 39. ☐ Other Local-Area Network/Internetworking

REMOTE/WIRELESS

A B

☐ 40. ☐ PDAs
☐ 41. ☐ Remote Access Products
☐ 42. ☐ Remote Access Services
☐ 43. ☐ Wireless Data Equipment/Services
☐ 44. ☐ Other Remote/Wireless

WAN EQUIPMENT & SERVICES

A B

☐ 45. ☐ Modems
☐ 46. ☐ Cable Modems
☐ 47. ☐ Asynchronous Transfer Mode (ATM)
☐ 48. ☐ Frame Relay Equipment including FRADS
☐ 49. ☐ Frame Relay Services
☐ 50. ☐ ISDN Equipment/Services
☐ 51. ☐ FT-1/T-1/T-3 Services
☐ 52. ☐ xDSL Services/Products
☐ 53. ☐ Diagnostic/Test Equipment
☐ 54. ☐ DSU/CSU
☐ 55. ☐ PBXs
☐ 56. ☐ Voice/Video over IP Gateways
☐ 57. ☐ Videoconferencing
☐ 58. ☐ Managed LAN/Router Services
☐ 59. ☐ Fax Servers/Services
☐ 60. ☐ Other WAN Equipment/Services

None of the above (1 – 60) A ☐ 61. B ☐

9. Please indicate the Network hardware/software/services that you are currently involved in purchasing or plan to purchase: (check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

SYSTEMS/PERIPHERALS

A B

☐ 01. ☐ Laptops/Notebooks
☐ 02. ☐ PCs
☐ 03. ☐ Windows Terminals/Thin Clients
☐ 04. ☐ Workstations
☐ 05. ☐ Storage/Backup (Optical,Disk,Tape,RAID)
☐ 06. ☐ Printers
☐ 07. ☐ Printer/Fax/Copier Hybrids (Multifunction Printers)
☐ 08. ☐ Minis
☐ 09. ☐ Mainframes
☐ 10. ☐ Fax/Modem Boards
☐ 11. ☐ Memory/Chips/Boards/Cards
☐ 12. ☐ Other Computers/Peripherals

SOFTWARE/APPLICATIONS

A B

☐ 13. ☐ Network Management (incl. SNMP)
☐ 14. ☐ Systems Management
☐ 15. ☐ Security
☐ 16. ☐ Directory Services
☐ 17. ☐ Operating Systems
☐ 18. ☐ Applications Development Tools
☐ 19. ☐ Database Management/RDBMS
☐ 20. ☐ Groupware
☐ 21. ☐ E-Mail
☐ 22. ☐ Enterprise Resource Planning (ERP)
☐ 23. ☐ EDI
☐ 24. ☐ Desktop Videoconferencing
☐ 25. ☐ Imaging
☐ 26. ☐ Middleware/Serverware
☐ 27. ☐ Document Management
☐ 28. ☐ Site Metering Tools
☐ 29. ☐ Data Warehousing
☐ 30. ☐ Anti Virus Software
☐ 31. ☐ Multimedia
☐ 32. ☐ Helpdesk
☐ 33. ☐ Other Software/Applications

SERVICES

A B

☐ 34. ☐ BPO (Business Process Outsourcing incl. Financial Services, HR, Logistics, etc.)
☐ 35. ☐ ASP Services
☐ 36. ☐ Call Center Outsourcing
☐ 37. ☐ Systems Integration/Consulting
☐ 38. ☐ Education/Training Services
☐ 39. ☐ Other Services

None of the above (1 – 39) A ☐ 40. B ☐

10. Please indicate the platforms that are currently installed/planned: (check ALL that apply)

A. Currently installed B. Planned for purchase

NETWORK PROTOCOLS

A B

☐ 01. ☐ TCP/IP
☐ 02. ☐ IPV6
☐ 03. ☐ SNA
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS/NETBUEI
☐ 07. ☐ NFS
☐ 08. ☐ SNMP
☐ 09. ☐ HTTP
☐ 10. ☐ Other Network Protocols

LAN/WAN ENVIRONMENT

A B

☐ 11. ☐ Gigabit Ethernet
☐ 12. ☐ Switched Ethernet
☐ 13. ☐ Fast Ethernet
☐ 14. ☐ Ethernet
☐ 15. ☐ ATM
☐ 16. ☐ Token Ring/Token Ring Switching
☐ 17. ☐ Layer 3,4 Switching
☐ 18. ☐ FDDI
☐ 19. ☐ 100Base-T
☐ 20. ☐ 10Base-T
☐ 21. ☐ Fibre Channel
☐ 22. ☐ Wireless LANs
☐ 23. ☐ DSL
☐ 24. ☐ ISDN
☐ 25. ☐ Frame Relay
☐ 26. ☐ Private Line T1, T3, FT-1, SONET
☐ 27. ☐ Other LAN/WAN Environment

NETWORK OPERATING SYSTEM

A B

☐ 28. ☐ Windows NT/Windows 2000
☐ 29. ☐ Novell (NetWare 5.X)
☐ 30. ☐ Novell (NetWare 4.X)
☐ 31. ☐ Novell (NetWare 2.X,3.X)
☐ 32. ☐ LINUX
☐ 33. ☐ Microsoft (LAN Manager)
☐ 34. ☐ Banyan (Vines)
☐ 35. ☐ IBM (LAN Server)
☐ 36. ☐ Other Network Operating System

COMPUTER OPERATING SYSTEM

A B

☐ 37. ☐ NT Workstation
☐ 38. ☐ Windows 2000
☐ 39. ☐ Windows 98/95/3.1
☐ 40. ☐ Intel based UNIX
☐ 41. ☐ RISC based UNIX (incl. SOLARIS)
☐ 42. ☐ LINUX
☐ 43. ☐ DOS
☐ 44. ☐ OS/2,OS/2 WARP
☐ 45. ☐ OS/400
☐ 46. ☐ IBM MVS/VM/VSE/ESA
☐ 47. ☐ Digital VMS
☐ 48. ☐ Macintosh
☐ 49. ☐ Other Computer Operating System

None of the above (1– 49) A ☐ 50. B ☐

11. Which of the following hardware platforms are installed/planned in your company?

(check ALL that apply)

A - Mainframes (Large Scale)

1. ☐ IBM
2. ☐ Other

B - Minis (Midrange)

1. ☐ IBM RS/6000
2. ☐ IBM AS/400
3. ☐ Digital/Tandem/Compaq
4. ☐ Unisys
5. ☐ H-P
6. ☐ Other

C - Workstations

1. ☐ Sun Microsystems
2. ☐ H-P
3. ☐ Digital/Compaq
4. ☐ IBM
5. ☐ Silicon Graphics
6. ☐ Other

12. What is the estimated gross revenue of your entire company/institution?

(check ONE only)

1. ☐ $20 Billion or More
2. ☐ $10 Billion to $19.9 Billion
3. ☐ $1 Billion to $9.9 Billion
4. ☐ $500 Million to $999.9 Million
5. ☐ $100 Million to $499.9 Million
6. ☐ $50 Million to $99.9 Million
7. ☐ $10 Million to $49.9 Million
8. ☐ $5 Million to $9.9 Million
9. ☐ $4.9 Million or Less
10. ☐ None of the above

13. For which areas outside of the U.S.A. do you have purchase influence?

(check ALL that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ Africa
7. ☐ Canada
8. ☐ None

FORM: 0001

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The Edge

Service provider developments at the juncture between the enterprise and the new public network

Briefs

Lucent last week unveiled a program designed to give providers of large-scale wireless networks the ability to support additional customized services.

The company's **Mobile Experience** includes various software applications, products and services to personalize voice and data content delivery. It works with a software-based platform called **MiLife Media** that provides voice browsing, audio content aggregation, alerting and streaming capabilities.

Products, applications and services will be available in June.

Lucent: www.lucent.com

Sonus Networks last week said **Qwest Communications** is deploying its packet voice technology under a multiyear, multimillion-dollar agreement. Qwest will use Sonus' GSX9000 Open Services Switch, IntelligentIP Softswitch, PSX6000 Softswitch and the SGX2000 SS7 Signaling Gateway in its optical IP network. Qwest last week announced a wholesale voice-over-IP terminating service using the Sonus gear, Qwest CyberVoice Interconnect.

Sonus: www.sonusnet.com; Qwest: www.qwest.com

Narus, a developer of back-office operations applications for service providers, last week said **Williams Communications** will deploy Narus products throughout its infrastructure.

Narus' software will help Williams gain visibility into network, service and customer activities. The **Narus Billing Mediation System** will let Williams develop business models for digital content distribution — such as video and audio — Web commerce, application hosting, messaging services, and other services, Narus claims.

Narus: www.narus.com; Williams: www.williamscommunications.com

Hawaii opts for optical Ethernet net

BY TERRI GIMPELSON

The state of Hawaii is deploying an optical Ethernet network to support increasing amounts of bursty data traffic and cap its investment in SONET.

Hawaii's Institutional Network (INET), which connects the state government, Department of Education, and the University of Hawaii and its community colleges, is in the early stages of implementing LuxN's WavSystem wave division multiplexing (WDM) platform to augment an OC-12 SONET ring. The multimillion-dollar installation will be completed in 60 days with a WavSystem in 25 sites.

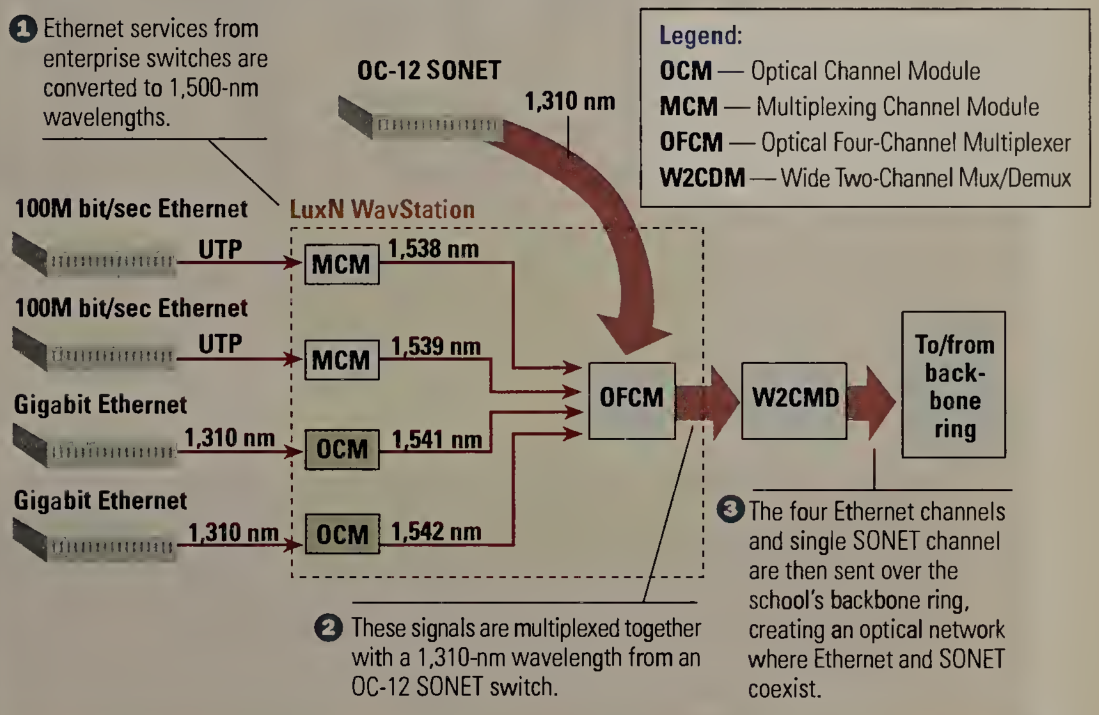
INET required WDM for its flexibility and bandwidth capacity as it extends its network to outlying areas. SONET proved unwieldy for handling increasing loads of data traffic from Ethernet and Gigabit Ethernet switches at the INET's three users.

"[WDM] simplifies things for us," says David Lassner, technology director at the

See **LuxN**, page 36

Aloha to optical Ethernet

The state of Hawaii hopes its new optical Ethernet network will provide a smooth transition from SONET for increased loads of bursty data traffic.



❶ Ethernet services from enterprise switches are converted to 1,500-nm wavelengths.

❷ These signals are multiplexed together with a 1,310-nm wavelength from an OC-12 SONET switch.

❸ The four Ethernet channels and single SONET channel are then sent over the school's backbone ring, creating an optical network where Ethernet and SONET coexist.

Legend:
OCM — Optical Channel Module
MCM — Multiplexing Channel Module
OFCM — Optical Four-Channel Multiplexer
W2CDM — Wide Two-Channel Mux/Demux

Optical gear closes gap between cost, revenue

BY JIM DUFFY

Two vendors are developing optical network products designed to narrow the gap between a service provider's costs and revenue growth.

Cinta Networks and Altamar Networks are making products that integrate optical switching and transport in the hopes that consolidating two pieces of equipment into one will entice service providers to open their pocketbooks in this capital-constrained environment.

Citing data from market researcher RHK, Cinta and Altamar say service provider revenue growth is not keeping pace with equipment costs. The growth in costs is more aligned with the exploding growth of traffic, while revenue is on a flatter incline, the companies say.

"One of the underlying messages of the slowing of capital expenditure is that service providers have been building out networks, and yet the connections have become a commodity," says Michael Howard of Infonetics Research. "They do need to have more revenue."

To bring revenue more in line with costs, Cinta is unveiling the WaveJunction LS3000 Lambda Switch, an opto/mechanical switch with tunable lasers that lets service providers initially deploy it as an integrated transport/switching system, or incrementally add wavelength switching as required to a WaveJunction transport shelf.

The result is a savings of up to 50% in the initial costs and 80% in the operating expenses for wavelength transport/switching, Cinta claims.

Each WaveJunction switch performs one optical-electrical-optical (OEO) conversion. When a wavelength enters the switch from a dense wave division multiplexer, it is converted into an electrical signal for switching and traffic monitoring.

Once the switching decision is made and the traffic leaves the switch fabric, it is converted back into light on egress. WaveJunction is upgradeable to a MicroElectroMechanical Systems fabric once MEMS becomes "reliable and cost-effective," Cinta officials say.

MEMS makes most sense at OC-768 rates, they say. Anything below that is suitable for electrical switching, company officials say.

WaveJunction is capable of supporting more than 4,000 ports per node, at line rates of 2.5G bit/sec OC-48 to 40G bit/sec OC-768, and switching capacity of up to 160 terabit/sec, Cinta claims. WaveJunction switches can be configured in optical ring or mesh topologies, and will support Gen-

See **Gear**, page 36

THE START-UP KING

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Lightscape beams from metro to regional nets

BY JIM DUFFY

HERNDON, VA. — Lightscape Networks last week announced products for metropolitan and regional networks designed to rapidly scale to meet the service demands of companies.

The company's XDM platform is an optical transport system that combines dense wave division multiplexing (DWDM) with SONET add/drop multiplexing, digital cross-connect capabilities and support for a handful of data protocols or services. It's positioned as a "hybrid" network element intended to replace several elements, and provide "point-and-click" service and circuit provisioning on demand.

This level of integration and rapid provisioning is designed to let service providers keep up with unpredictable net growth spawned by the voracious appetite for more bandwidth and new services from firms.

XDM is an electrical switch that will transition to a MicroElectroMechanical Systems fabric. It's designed to scale from the metro edge through the metro core to regional long-haul applications.

As such, XDM is a single architecture intended to replace disparate products and system architectures from multiple vendors in each of those applications. This multiplatform dilemma slows service provisioning, limits scalability and requires multiple, incompatible management tools, Lightscape claims.

XDM supports SONET, Ethernet, Gigabit Ethernet, IP and ATM services in a ring, mesh, star or linear configuration. A single chassis supports 40 to 80 DWDM channels and multiple SONET rings at OC-3 to OC-192 line rates. As a digital cross-connect, XDM supports 2,304 52M bit/sec Synchronous Transport Signal level 1 signals in non-blocking mode with sublambda grooming, the company says.

A single XDM bay can support 768 OC-3 ports. A single shelf can support 24 OC-48 ports, Lightscape says.

XDM provides a better than 4-to-1 cost savings over SONET gear, Lightscape claims. A network configuration requiring 48 SONET add/drop multiplexer shelves and three digital cross-connects would only require 12 XDM shelves, the company says.

Pricing for XDM starts at $30,000. The system is available now.

Lightscape: www.lightscape.com

PROFILE: LIGHTSCAPE

Location:	Herndon, Va.
Founded:	January 2001 as a subsidiary of ECI Telecom
Products:	XDM optical transport and service platform for metropolitan edge, core and regional networks.
Management:	Eran Dariel, CEO
Employees:	1,000
Customers:	Deutsche Telekom, Cable & Wireless, Global One, Vodafone
Fun fact:	Lightscape already had 1,000 employees, 45 customers and $260 million in revenue before it was "founded" earlier this year.

Gear,
continued from page 33

eralized Multi-protocol Label Switching later this year for topology discovery.

Links can be restored in 20 milliseconds to 50 milliseconds, Cinta claims.

WaveJunction will also support the Optical Internetworking Forum's user-to-network interface for "on-demand" circuit provisioning.

WaveJunction is entering customer lab trials within the next 30 days. General availability will be in the summer. The first release of the product will have 256- and 1,024-port switch fabrics. The 4,000-port fabric will emerge in the fourth quarter.

While Cinta is focused on thousands of ports, Altamar is talking millions of ports. The Ditech Communications subsidiary is rolling out what it calls the Titanium Optical Network System for long-distance nets.

Like WaveJunction, Titanium is an integrated transport and switching system that Altamar claims is expandable to two million OC-48 ports, with a total switching capacity of 5,500 terabit/sec, or 5.5 petabit/sec. This density is intended to keep the cost of providing data services low for service providers. Current generation equipment cannot scale cost-effectively to support traffic growth, Altamar claims.

As a result, the cost of delivering data services is going to go up to the cost of voice services, says Rob Newman, executive vice president of market development for Altamar.

"Carriers will either stop putting equipment in or pass that cost off to the business customer," he says. "Customers will either pay a lot more or just not get what they want."

Established vendors, fast risers and scores of other start-ups — such as Cinta — will compete with Altamar, which is a potentially daunting challenge. But so far, no one is proposing the kind of scalability Altamar is, analysts say.

"It really is an order of magnitude beyond what we're seeing in the market — if they can do it," says Nancee Ruzicka of The Yankee Group. "As you add traffic, at some point it gets much harder to manage the complexity and the volume of the traffic in the switch fabric. So that will be the real test because on a device like this, you're really putting your whole network on it."

Titanium features three shelves — transponder, switch and optical — that fit into a seven-foot bay. The switch is electrical and performs two OEO conversions before traffic exits.

The amplification shelf sports Erbium-doped fiber and Raman amplifiers for signal spans of 1,000 kilometers without regeneration. It also performs mulitplexing/demultiplexing and dispersion compensation.

Titanium incorporates a feature called Virtual Rings, which is designed to replicate SONET's resiliency. When Titanium establishes an optical connection, Virtual Rings will automatically calculate a back-up connection.

If the primary connection fails, the traffic will be rerouted to the back-up connection within 50 milliseconds, identical to a SONET protection scheme.

Titanium uses an "[Open Shortest Path First]-like" protocol to establish the Virtual Rings, Newman says. The system will support Generalized Mutli-protocol Label Switching in its second release — slated for the third quarter of 2002 — for meshing.

Meshing will let service providers minimize the amount of bandwidth reserved for network protection and thereby make a larger percentage of the overall network capacity available for revenue-generating traffic, Altamar says.

Production shipment of Titanium is scheduled for the first quarter of 2002. Altamar says the cost to deploy 4,096 OC-48 Titanium ports is about $83 million. ◪

LuxN,
continued from page 33

University of Hawaii. "We didn't have to perform a complete forklift of our current platform. If we were replacing the SONET completely, we would have also had to change out all our [customer premises equipment] at all sites. This way we can do it gradually."

The INET backbone is made up of two physical rings. The rings are tied together at the Hawaii Community College campus using a Fujitsu SONET switch and a Cisco Layer 3 switch.

INET considered upgrading this network OC-48 SONET to handle increasing traffic loads, but that would involve replacing the SONET add-drop multiplexers at each site. Also, the three users of the SONET ring had different bandwidth requirements. Independently allocating, regulating and expanding the network capacity would be difficult in the shared SONET ring because all three users would have to agree on any change.

In addition, each user had different voice and data requirements ranging from T-1 to 10/100M bit/sec and Gigabit Ethernet. While T-1 service is easily mapped into SONET, the various data services would require SONET framing and the inherent overhead and bandwidth inefficiencies.

INET decided to keep the existing OC-12 SONET network in place, carrying traffic using the 1,310-nm wavelength. Ethernet would be multiplexed natively onto the ring at various International Telecommunication Union 1,500-nm wavelengths, essentially creating multiple virtual networks over one pair of fiber.

At the backbone location, the individual International Telecom Union wavelengths are wave division multiplexed together, and this signal and the 1300-nm wavelength from the collocated SONET switch are combined into a single fiber output (see graphic, page 33).

The WDM in INET's new optical Ethernet network is key, Lassner says.

"If we were to implement Ethernet directly at the optical layer without WDM technology, we could only have one carrier," he says. "This would give us substantially less capacity and would also make network management among three independent users much more complex, perhaps even unworkable."

A wholesale change-out of the SONET infrastructure would also be unworkable. INET is keeping SONET around for now to limit the scope of its upgrade project and take advantage of SONET's 50-millisecond path recovery, which optical Ethernet cannot yet match.

As a result, optical Ethernet will "underlay" INET's existing SONET infrastructure, he says.

The smaller scale of the INET project is just about the right size for the LuxN product, says Ronald Kline, senior analyst at RHK.

"Private networks don't have to worry about [large-scale] integration or sharing," Kline says. ◪

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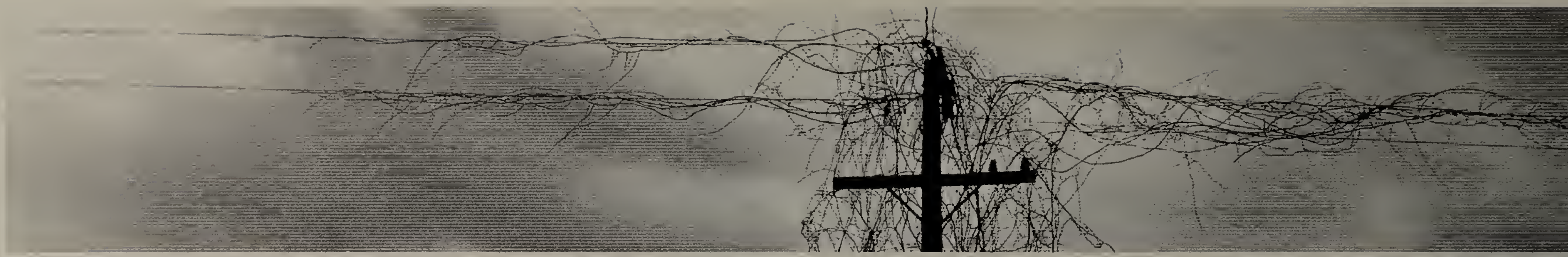

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Briefs

Enterprise customers needing a storage service that employees can access from anywhere can now get it from **Exodus** thanks to a partnership between the Web hosting firm and **Scale Eight**. The partnership announced last week means Exodus users will have access to Scale Eight's **MediaStore** Internet storage infrastructure service. MediaStore uses parallel systems technology to leverage thousands of disks and hundreds of servers to deliver documents and media files to users anywhere in the world. The service is available through Exodus and is priced on a pay-per-use basis, according to an Exodus spokeswoman.

Exodus: www.exodus.com; Scale Eight: www.scaleeight.com

Symantec announced anti-virus software for the **Palm** operating system to combat the small, but growing numbers of computer viruses aimed at disrupting use of the handheld device. Symantec **AntiVirus 2001 for Palm OS** is a two-part application that runs on a handheld and the user's desktop PC. That's because the PC is needed to download the necessary virus updates from Symantec's Web site, a routine process for fighting newly discovered viruses by adding their "signatures" to the known virus repertory. The Palm Pilot device using Symantec's antivirus product obtains the virus updates in any of three ways: by infrared beaming, by Cellular Digital Packet Data-based modem or by hot-syncing with the PC, depending on the user's particular Palm Pilot. Symantec may refine the product to transmit virus updates directly to the Palm through wireless broadcast, says Tom Powledge, group project manager at Symantec. The software costs $40.

Symantec: www.symantec.com

Web hosting firms step up services

Customers want data backup, security, storage and application management.

BY JENNIFER MEARS

At Cotyshop.com sales are going like gangbusters. Since Coty revamped its online consumer site a year ago, executives say revenues have increased 80%. The global marketer and manufacturer of men's and women's fragrances, skin-care products and cosmetics has had a Web presence for five years, starting with brochure-type sites and a corporate home page. It outsourced those sites from the beginning, going with small Web developers or ISPs to handle the online headaches.

"We made a very clear decision early on that we would not host any Internet sites internally," says Barbara McSpedon, director of global communications for Coty.

So when Coty decided to launch a transaction-based e-commerce site two years ago, the question wasn't whether to outsource it, it was with which company. McSpedon knew that not just any Web hosting firm would do. She wanted a fully managed service — something that is becoming increasingly popular as more businesses go online, either with e-commerce ventures or with hosted applications that keep employees scattered across the globe connected.

Web hosting companies are responding to the complex needs of larger businesses. These hosting firms are developing standardized configurations so they can launch more services, more quickly, at a lower cost than businesses could on their own. In addition, special services such as round-the-clock monitoring, caching and security mean many businesses can get better performance from a

See **Hosting**, page 42

www.nwfusion.com

THE COLLOCATION CONUNDRUM

Listen to a RealAudio broadcast from ComNet 2001 and find out what services you can and can't get from a hosting provider.

DocFinder 3426 find it online

NCompass bolsters content management software

Resolution 4.0 works with Microsoft Commerce Server and adds clustering and archiving features.

BY JOHN FONTANA

With enterprise Web sites becoming more like enterprise content sites, NCompass Labs next week will release software designed to help those building storefronts with Microsoft Commerce Server more easily manage their mountains of data.

Content management features are one of the weak spots in Commerce Server, and NCompass is embedding its Resolution 4.0 into the Microsoft server software.

On top of that integration, Resolution 4.0 also adds support for clustering, archiving, content personalization and version/revision tracking.

Content management software lets Web site administrators and developers off-load to end users the tasks of creating and publishing content to a Web site.

"We are a small technology development group, but being a financial institution our Web site content changes frequently," says Eileen Flanagan, manager of the application development unit in the Global Investment Group division of the American International Group, a top insurance and financial services company.

"With Resolution, we took responsibility for those changes out of the developer's hands," she adds.

Flanagan chose Resolution over other content management packages from Vignette and Interwoven because of its simplicity.

"We didn't want to learn a new scripting language and we didn't need all the features, plus the cost was too high for us," Flanagan says.

But she doesn't have immediate plans to integrate Resolution with Commerce Server, which runs only on the Windows 2000 platform. "We are not far along in our Windows 2000 rollout," she says.

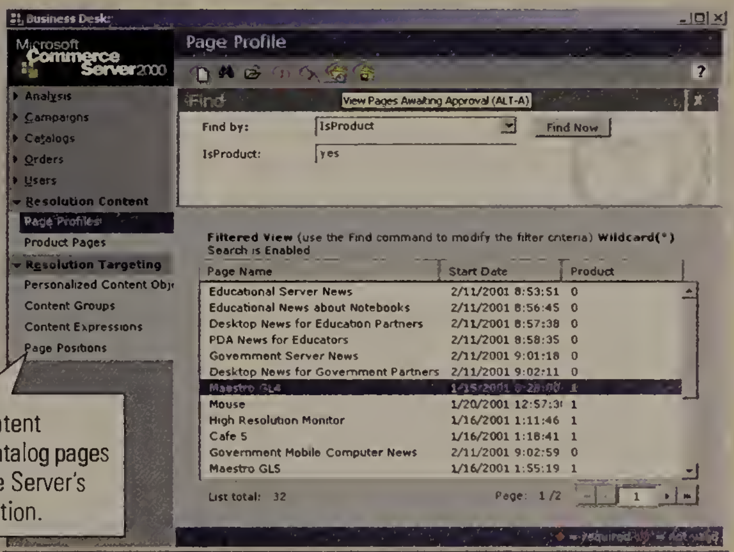
Fortunately, Resolution 4.0 runs on Windows NT 4.0 as well as Win 2000.

But one of the highlights of the 4.0 release is the Resolution Content Connector, which allows users to run the software directly from Commerce Server interfaces.

See **Resolution**, page 42

Working together

NCompass Labs is integrating its content management software, Resolution 4.0, with Microsoft's Commerce Server.



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Page Name	Start Date	Product
Educational Server News	2/11/2001 8:53:51	0
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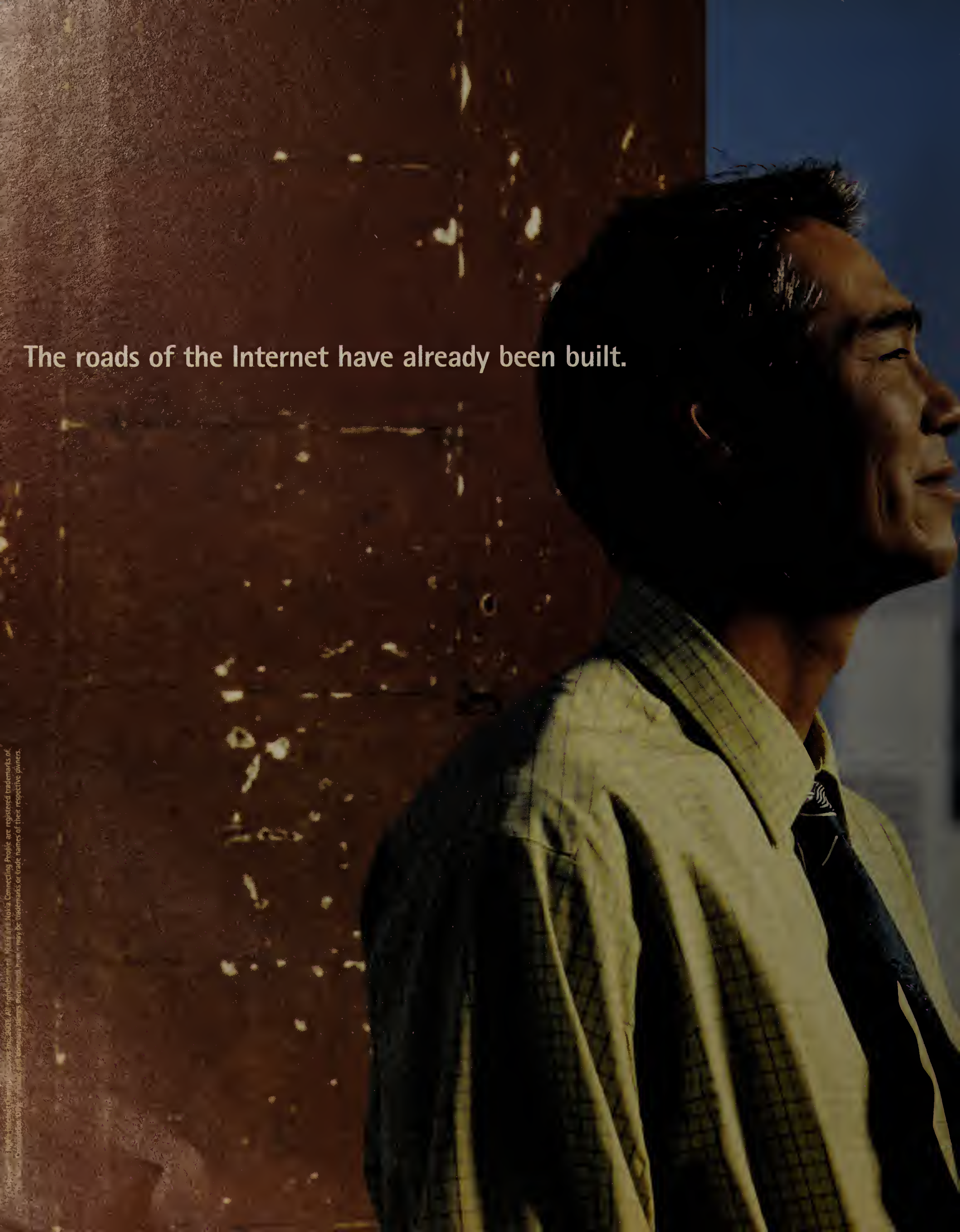
Desktop News for Education Partners	2/11/2001 8:57:38	0
PDA News for Educators	2/11/2001 8:58:35	0
Government Server News	2/11/2001 9:01:18	0
Desktop News for Government Partners	2/11/2001 9:02:11	0
Maestro GL4	1/15/2001 [illegible]	1
Mouse	1/20/2001 12:57:3	1
High Resolution Monitor	1/16/2001 1:11:46	1
Cafe 5	1/16/2001 1:18:41	1
Government Mobile Computer News	2/11/2001 9:02:59	0
Maestro GLS	1/16/2001 1:55:19	1

List total: 32 Page: 1 /2 1

Users can manage content contained on product catalog pages from within Commerce Server's Business Desk application.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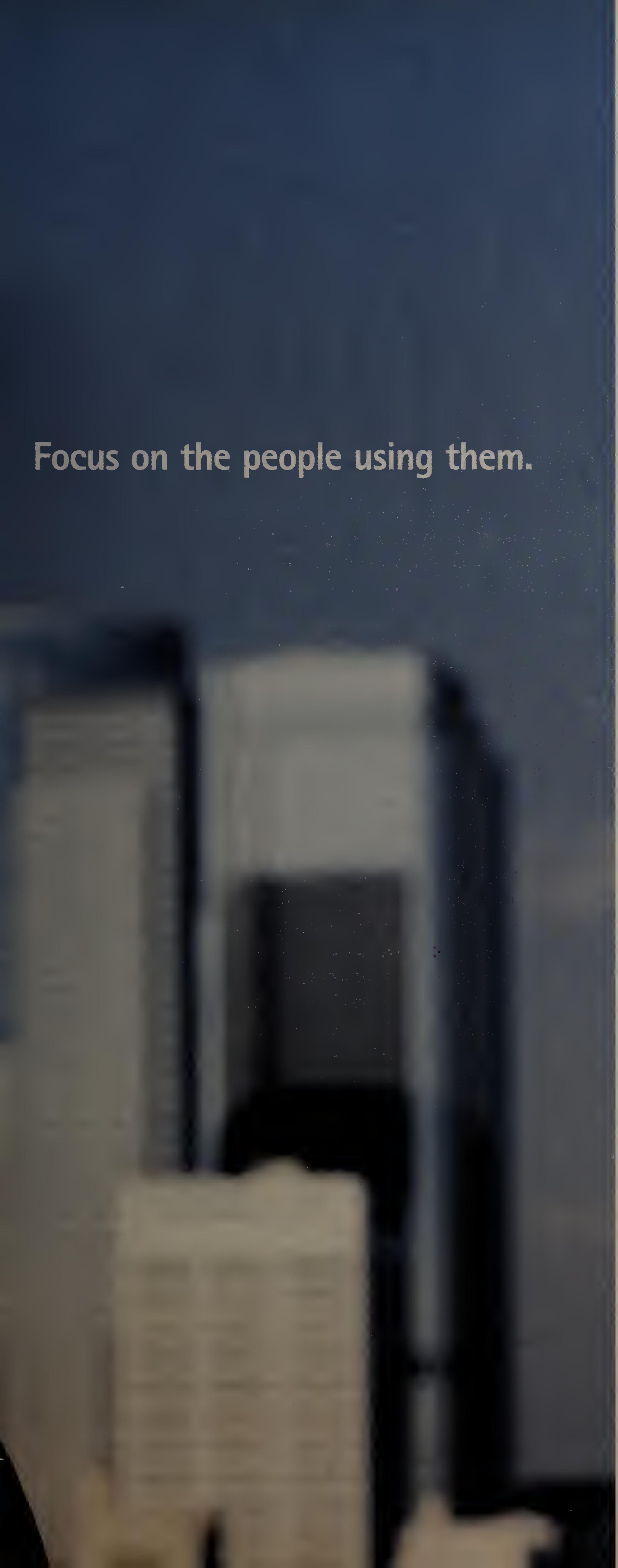

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Playing host

As the market evolves, hosting service providers (HSP) will diversify. IDC has defined several provider types, with their strengths and weaknesses. The following are just a few:

HSP type	Focus/characteristics	Competitive advantages	Vulnerabilities
NSP (Network service provider) Examples: AT&T, WorldCom, which acquired Digex	• National/international backbone networks with major metropolitan market presence • Global assets or alliances	• Low-cost bandwidth • Control of physical networks • Potential for global reach	• Single network dependent on peering for broader reach • Focus on pipes, not applications
DCP (Data center provider) Example: Exodus	• Multiple U.S. data centers and major regional/global expansion plans • Network capacity from multiple carriers	• Broad market presence • IT infrastructure expertise • Scalable assets	• Inability to control network quality of service • Little differentiation of service • Low barriers to entry
ANP (Application network provider) Examples: Digital Island, Intira	• Smaller-scale combination of above two categories • Targeted customer solutions and applications focus	• Applications knowledge • Premium services • Systems integration eCommerce, Web strategies	• Limited footprint • Financial resources constraints • Market power

Hosting,

continued from page 39

Web hosting company than they could if they implemented and maintained the network themselves.

"Really, the hard part isn't even trying to construct it, as much as they don't even have the skills for all those pieces," says Andy Hunn, senior director of business development for Web hosting firm Digex. "Most companies don't have a massive technical organization that is highly skilled in Internet technologies."

Although the move into the Web hosting data center market has been slow, market research firm IDC predicts the trend to pick up quickly, increasing sixfold from $4 billion in revenue in 2000 to more than $24 billion by 2004.

"A lot of companies are asking their providers to do more stuff, not just provide floor space to stick all the company's equipment in," says Melanie Posey, an IDC analyst who authored a Web hosting services report. "They're saying, 'We don't even want to deal with this at all — you do it.' "

That's the approach Coty took, leaving its e-commerce site — and its Web-related worries — in the hands of IBM Global Services.

Higher-level services

No longer are raised floors, diesel generator backup and ventilation systems enough. As large organizations move their applications and Internet ventures into data centers, they are looking for services such as data backup, security and storage services, application management, load balancing and real-time network monitoring.

Web hosting companies are responding to the demand, and corporate network managers can expect to see yesterday's Web hosting company morph into a combination network, application and professional services provider. Analysts expect to see partnerships and strategic alliances as Web hosting companies expand their services.

Consider the deals during the past year: WorldCom/-UUNET acquired Digex through the service provider's proposed merger with Digex parent Intermedia, expanding Digex's reach and network backbone; Web hoster Exodus acquired GlobalCenter, the hosting subsidiary of network service provider Global Crossing, enhancing its managed services capabilities; and hosting company Verio was acquired by NTT Communications, the long-distance and Internet operations division of Japanese carrier Nippon Telegraph and Telephone, widening Verio's reach and helping to lift it into the managed services market.

Collocation remains an important part of the Web hosting market. Many companies still want basic real estate, which means a highly secure, well-maintained place to put their servers. Others, however, will want more.

Take Coty, for example. The firm reported $1.8 billion in sales for the year ended June 30, 2000, and employs more than 8,000 people in 29 countries. Why would a company with such deep resources choose to outsource its Web-related ventures — from static corporate sites to dynamic e-commerce Web shops?

The answer, McSpedon says, is that Coty decided that its focus was on making and selling products, not running Web sites. In addition, she says, finding top IT talent wasn't easy and the cost of launching and supporting Web ventures in-house just didn't make sense.

"We made the decision not to build an internal organization to support this," she says. "Like most companies, we're looking at this conservatively, and looking at it to see where everything is going. So instead of making a big investment, we're selectively bringing up sites and outsourcing into facilities like IBM so we can capitalize on the very large infrastructure they have in place."

Perhaps most importantly, McSpedon says Coty wanted to make sure its e-commerce site had the 99.9% availability demanded in the marketplace and an international reach — all of which IBM could provide with its menu of managed services. "We look at them as an extension of our team on the Web side," she says.

For IBM's part, its Global Services division is using decades of know-how to offer a fully managed Web hosting service that customers can feel comfortable using. When it comes to managed services, "we just have it in our DNA," says Rusine Mitchell-Sinclair, general manager, managed e-business services for IBM Global Services. "We're not growing up to the managed services, that's where we started. We actually came down the continuum by doing collocation."

Digex is another Web hosting company that has been offering fully managed services from the beginning — in Digex's case, since 1996.

Both IBM and Digex offer standard, preconfigured platforms, meaning the companies claim they can get customers up and running in days instead of months.

Digex's Hunn says his firm is committed to responding to the higher-end needs of customers who want a fully managed service. Earlier this year, for example, Digex launched a client portal created with partners Compaq and Microsoft that gives customers real-time access to billing information, trouble tickets and other data associated with their accounts.

Exodus, which started as a collocation provider, is expanding into managed services. Dave Asprey, director of strategic planning, says the firm started focusing on managed services in 1999 because it realized the enterprise market would have more complicated needs. Exodus also offers standard network and server infrastructure to speed deployments and recently announced partnerships to expand its content distribution and storage capabilities.

Verio, which has targeted mostly small and midsize companies, is also moving into the managed services arena. Doug Schneider, president of Web services for Verio, says the company is offering its managed services on an a la carte basis, so companies can choose what they need.

Hosting firm NaviSite last year began offering streaming media services, another area hosting firms predict will become more in demand. Other areas where hosting firms plan to launch new or enhanced services include application management, leading to partnerships with application service providers and software vendors; storage-area networks, giving customers access to storage on demand; wireless services, making data accessible anytime and from anywhere; and service-level agreements that go beyond infrastructure to detail business services.

Here to stay

"A lot of people have been saying that, 'Oh, well all the dot-coms are dead so therefore the brick-and-mortar companies can stop spending on their Web initiatives because the dot-coms aren't going to eat their lunch after all," IDC analyst Posey says.

"But that's just stupid, because a lot of the dot-coms are gone, but the Internet is still there. So [companies] still have to do something," she adds.

Yankee Group analyst Carrie Lewis agrees, and says managed services will be the key to bringing firms into Web hosting companies' data centers.

"As these hosting providers become more sophisticated and offer more services, I think the enterprise customers are going to look up and say, OK, this is something we should look at now," she says.

IBM: www.ibm.com; Digex: www.digex.com; Exodus: www.exodus.com; Verio: www.verio.com; NaviSite: www.navisite.com

Resolution,

continued from page 39

"We are really beefing up the Commerce Server platform," says Chris Ramsey, product marketing director for NCompass. "Web sites are being used for electronic commerce and that means end-users need to put new content on a site daily."

Add cluster support

In addition to integration features, NCompass has added cluster support so the software is compatible with load-balancing technology used to support many large Web sites.

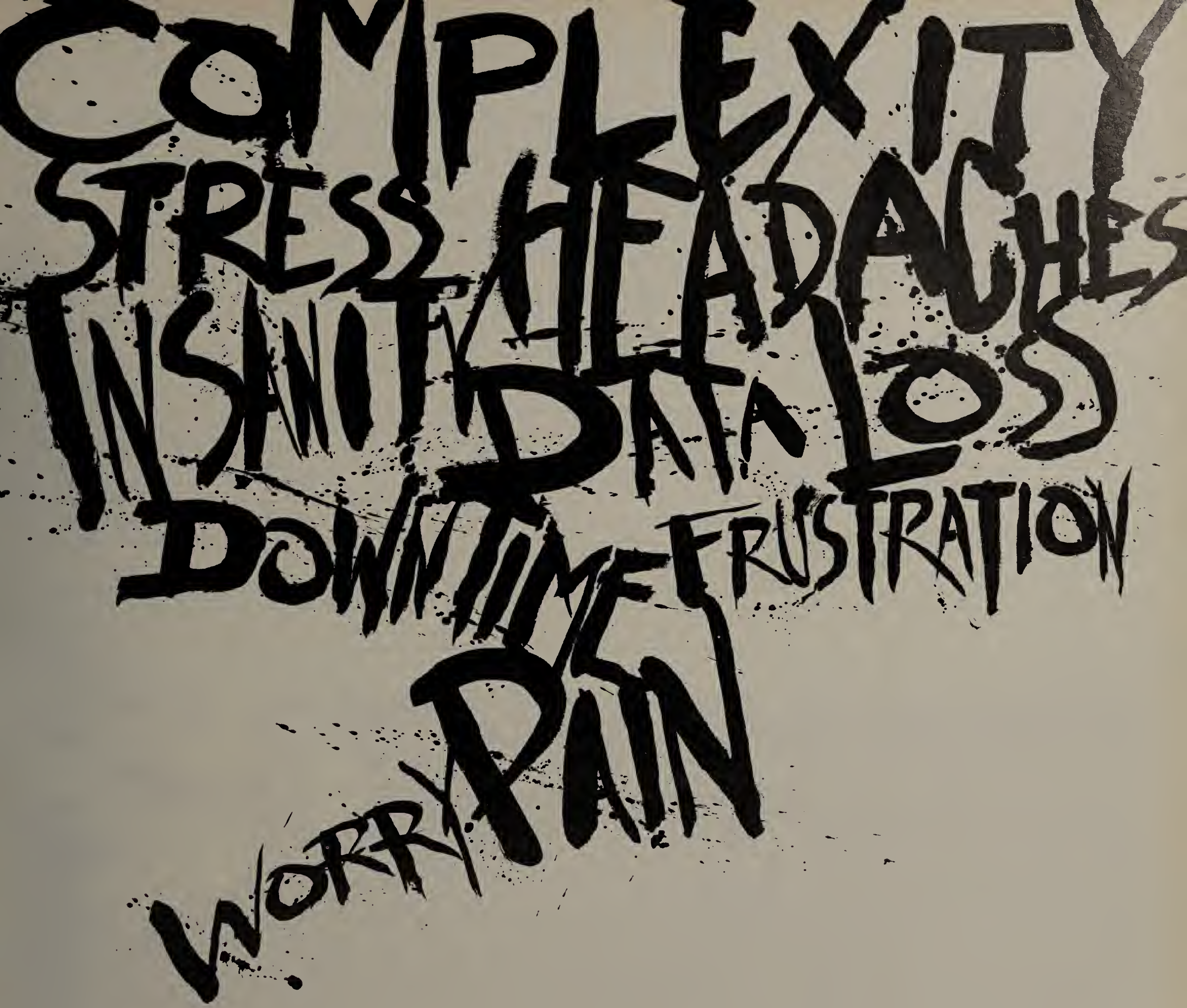
NCompass also has added meta-tagging capabilities to facilitate personalization of Web content, and site archiving so end users can view a Web site as it appeared on any past date in time.

A versioning and revisioning feature lets users track changes to content, objects and code.

Resolution 4.0 stores its content on SQL Server 7.0 or 2000, and uses Active Directory or NT domains to assign access rights to authors, editors and template developers.

Resolution 4.0 is priced at $59,000, with the connector for Commerce Server priced at $10,000.

NCompass: www.ncompasslabs.com



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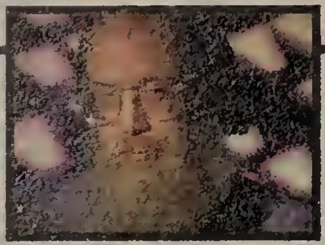

'Net Insider . Scott Bradner

CAN SOMEONE *PLEASE* SUE ONE OF THEM?

I'm sad to say it did not surprise me when CNN announced yet another case of credit card and other customer information getting stolen from a hacked Web site.

The scale was a bit of a surprise though — 40 U.S. Web sites, along with some yet unrevealed number of non-U.S. sites, had been broken into and information on more than a million credit cards was stolen. CNN pointed to an FBI advisory memo for the details. The memo (www.fbi.gov/pressrm/pressrel/pressrel01/nipc030801.htm) is a bit terse, but reveals the break-ins have been going on for a while, have all been on Windows NT servers, and the perpetrators are not exploiting new security holes. They are using holes that Microsoft fixed as long ago as 1998!

It's bad enough that more and more Web sites are using the same software — it's almost as if there's a concerted effort to ensure that the maximum number of sites will be vulnerable when a new security hole is found.

It's even worse when the site operators cannot even keep the software up-to-date. In this case, Microsoft made the patches available for free.

Here are sites with tens or hundreds of thousands of customer records on their servers, many doing millions of dollars a year in e-commerce transactions and they can't get around to applying free security fixes?

(You can find out if your site is one of the tardy ones by getting a soon-to-be-released, free scanning tool from The Center for Internet Security at www.cisecurity.org/toolreq.html).

Where have the security people at these sites been? Where have their auditors been? I've watched the Harvard internal auditors in action reviewing Web servers, and one of the first things they do (after checking to be sure there are no accounts on the server that do not have passwords) is to verify that the software is fully up-to-date. It shouldn't take someone with a lot of clues to figure out that this should be done.

There seems to be empirical evidence that the number of clues in the world about any given topic is a constant and as the number of practitioners of that topic rises, the average clue density goes down. And e-commerce is a rather big thing these days.

If we cannot depend on the site operators having any idea how to run a Web site securely, what chance do we have? The only one I can think of is a court finding that Web site operators who commit these sorts of lapses (and their auditors who do not identify such lapses) should be legally liable for the cost of everyone recovering from their stupidity — along with substantial punitive damages.

Disclaimer: Harvard, an arms merchant for lawyers, has not expressed an opinion on this situation.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.

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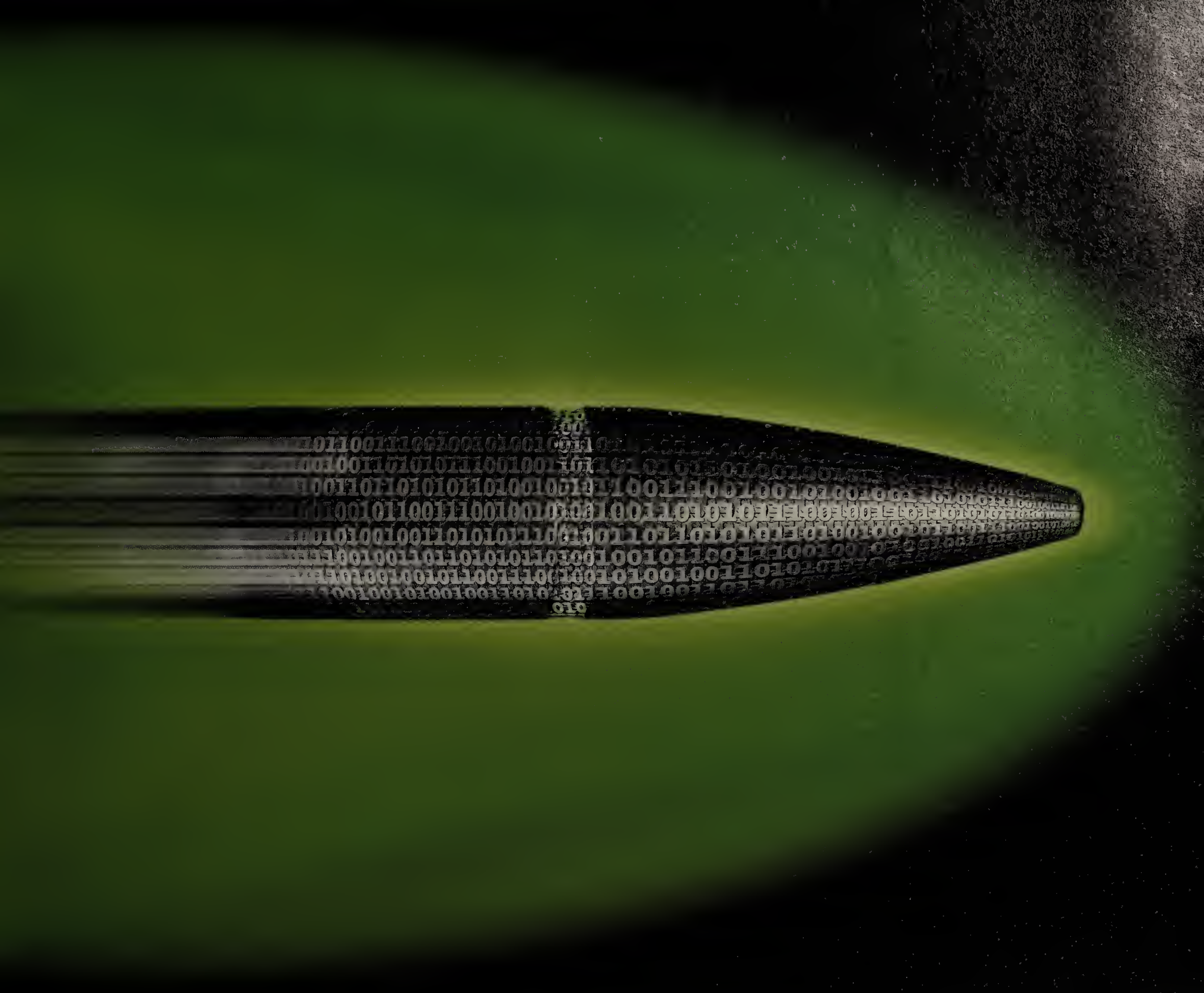

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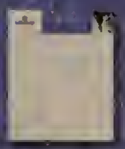

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Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

TCP/IP multiplexing boosts sites

BY MICHEL SUSAI

When a user requests a Web page, his browser sends numerous requests for different types of information — such as Java applet, multimedia and database access — resulting in as many as 50 connection requests to Web servers.

The server opens a socket and allocates memory and processes for that user, opens a session for the user, acknowledges the client's HTTP request, fetches relevant data from cache or disk memory, flows the data back to typically slow access connections and finally closes the session.

The user's next mouse click initiates the process again.

If a user's session includes static and dynamic content and an e-commerce transaction, each type of request requires a new connection, and the Web server or servers must dedicate resources for each. This slows the server's response time, taking resources from its primary task — to serve Web content.

HTTP 1.1 lets a browser send multiple requests across a persistent connection to a server, eliminating some overhead from a single client. Content providers, however, effectively turn off this feature because if connections are left open for each client session, a site will soon run out of server resources. And if the connection is kept open, you need to limit it to 5 to 15 seconds to avoid tying up your servers with idle connections.

One new approach to Internet connection management is using TCP multiplexing to break the client/server connection dependency. TCP multiplexing systems keep client-side connections open with longer timeouts. By eliminating most of the "hello-goodbye" setup and tear down overhead so that transactions can flow freely over the WAN via managed server connections, these systems dramatically improve the efficiency of high-traffic Web sites and Internet services.

WAN latency is a significant cause of congestion on the Internet. Dynamic transactions and content updates require access to origin sites across the WAN, causing delays that add up to several seconds, or even minutes, for large transfers.

Consider a Web page with 50 objects, each requiring three packets to open a connection and four packets to close. Assuming 200 msec of latency per round trip and four concurrent browser connections, that's 16.8 seconds of TCP overhead to load one page, vs. just 1.4 seconds across a persistent, managed connection using the TCP multiplexing method.

TCP multiplexing aggregates and manages Internet connections to not only reduce server loads, but also ensure rapid content delivery.

A TCP multiplexing system improves the efficiency of the Web server farm or Internet service by acting as a thin connection (or channel) proxy to servers, caches and content delivery networks.

The system receives TCP/IP requests, consolidates them and applies logic to the opening and closing of server connections. It can direct and funnel client requests into high-speed server sessions that avoid the constant interruption of setup and tear down.

The TCP multiplexing engine monitors each incoming and outgoing packet to manage sessions and determine when a connection can be used for another client. The server no longer has to expend its processing power setting up and tearing down sessions for each user request.

It can also manage packets to protect against traffic spikes and attacks, provide access control and direct content delivery. Additionally, since client sessions are managed by the TCP multiplexing engine, the network overcomes the TCP slow-start overhead that is inherent to TCP/IP networking. The client is no longer required to wait while the server tries to gauge the quality of the client connection.

The results are:

- Faster site response time.
- Better server and network resource utilization.
- Increased Web server processing capacity.
- Protection against traffic surges and denial-of-service attacks.
- Improved end-user experience.
- Increase in revenue due to increased customer retention.
- Reduction in WAN latency.

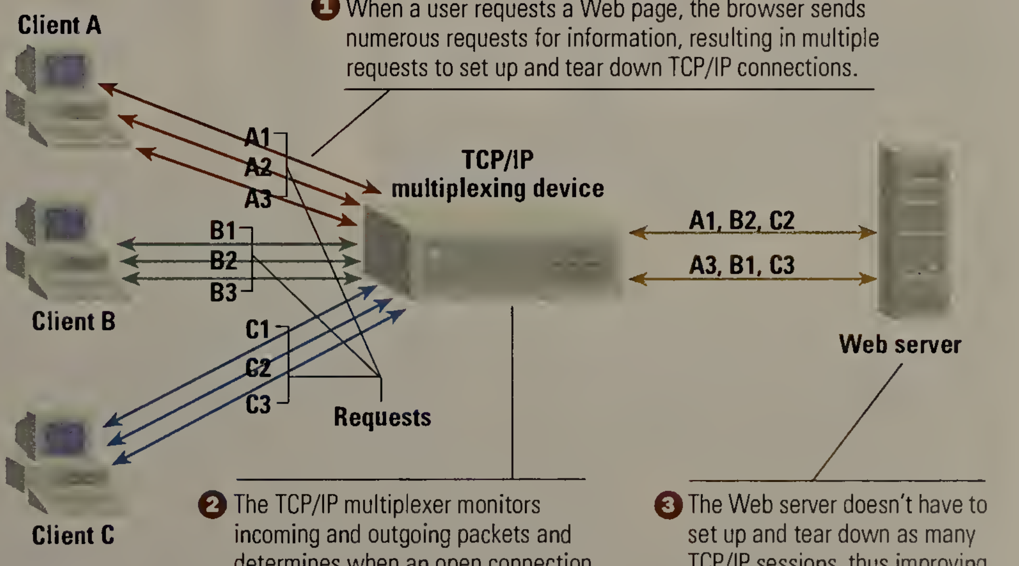
TCP/IP was not designed to keep pace with today's content, transactions and infrastructure. TCP multiplexing offers a solution that Web sites and Internet services can deploy without changing their existing TCP/IP network topologies.

Susai is chairman and chief strategy officer of NetScaler, Inc. He can be reached at susai@netscaler.com.

HOW IT WORKS

TCP/IP multiplexing

A TCP/IP multiplexing engine takes TCP/IP requests, consolidates them and applies logic to the opening and closing of server connections. This improves Web server performance.



❶ When a user requests a Web page, the browser sends numerous requests for information, resulting in multiple requests to set up and tear down TCP/IP connections.

❷ The TCP/IP multiplexer monitors incoming and outgoing packets and determines when an open connection can be used for a new client request.

❸ The Web server doesn't have to set up and tear down as many TCP/IP sessions, thus improving Web site performance.

Ask Dr. Intranet

By Steve Blass

How can we handle virus alert messages in our intranet? We want employees to be vigilant about viruses, but we're tired of all the junk virus alert e-mail traffic clogging up our network and our servers, and wasting our employees' time. We even had one virus spread through the company attached to a virus warning.

My recommendation for handling virus alerts is to make it somebody's job. It may not be a full-time job, but should belong to one person. Train employees to ignore and delete virus alerts that come from anyone else. Establish a fixed location on the intranet, such as your portal home page, where virus and other alerts are officially posted. And keep your users' antivirus software up-to-date. Norton and McAfee offer Web-based automatic virus definition updates. Hosted antivirus application services are available, and many service providers offer e-mail gateway virus scanning with premium Internet services. In addition to establishing an official channel for distributing virus and network security alerts and updates, encourage (or force) your users to disable the preview panes in their e-mail clients and keep current with vendor-released security patches. Make sure your organization's business data exists in multiple locations. Back up and archive. Audit your operating systems regularly and discourage ad hoc end-user software installation.

Blass, a network architect at change@work in Houston, can be reached at drintranet@changeatwork.com.

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Clustered File Systems	2000	not yet
Global Network Services	2000	not yet

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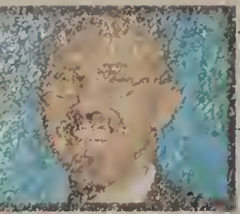

Gearhead . inside the network machine . Mark Gibbs

WHAT YOUR DNS KNOWS

The story over the past few columns: DNS is being beaten like a rented mule. Now read on …

For a DNS server to know about the databases that tell it what its world looks like, the server needs a configuration file. Here's what one would look like for the example we've been using if the server was based on BIND Version 4:

```
primary     redqueen.com     redqueen.db
primary     120.65.206.in-addr.darpa     206.65.120.db
primary     0.0.127.in-addr.darpa     127.0.0.db
cache     .     cache.db
```

For BIND Version 8, this would look like:

```
zone  "redqueen.com" in {
        type master;
        file "redqueen.db";
        }
zone "120.65.206.in-addr.darpa" in {
        type master;
        file "206.65.120.db";
        }
zone  "0.0.127.in-addr.darpa" in {
        type master;
        file "127.0.0.db";
        }
zone "." in {
        type hint;
        file "cache.db";
        }
```

The first database in both formats is for the forward mapping data, the second for the reverse mapping data and the third for the loop-back data. The last database is the cache database — referred to as "cache" in Version 4 and "hints" in Version 8. This cache data is where the root servers are.

So far, we've only discussed one of the record types that define DNS data: the Start of Authority (SOA) record. There are many other types that need to be defined to describe the DNS server's world.

The Name Server (NS) records define the name servers for a zone, thus in redqueen.db after the SOA records we'll have:

```
redqueen.com     IN     NS     alice.redqueen.com
redqueen.com     IN     NS     kitten.redqueen.com
```

That says two servers, "alice" and "kitten," handle the redqueen.com zone. Where are the servers? This is where we use the address records:

```
localhost.redqueen.com     IN   A   127.0.0.1
alice.redqueen.com         IN   A   206.65.120.2
kitten.redqueen.com        IN   A   206.65.120.3
hatter.redqueen.com        IN   A   206.65.120.4
dormouse.redqueen.com      IN   A   206.65.120.5
dormouse.redqueen.com      IN   A   206.65.120.6
```

"A" stands for address. First we have the loop-back mapping for the machine we're on, mappings for "alice," "kitten" and "hatter," and then two more for a dual-homed host called "dormouse."

You might want a machine to be referenced under two names. There is a record called a Canonical Name (CNAME) record. Thus:

```
teaparty.redqueen.com   IN CNAME   hatter.redqueen.com
sleepy.redqueen.com     IN CNAME   dormouse.redqueen.com
```

These entries designate alternate names for "hatter" and "dormouse" ("teaparty" and "sleepy," respectively).

It gets even better next week.

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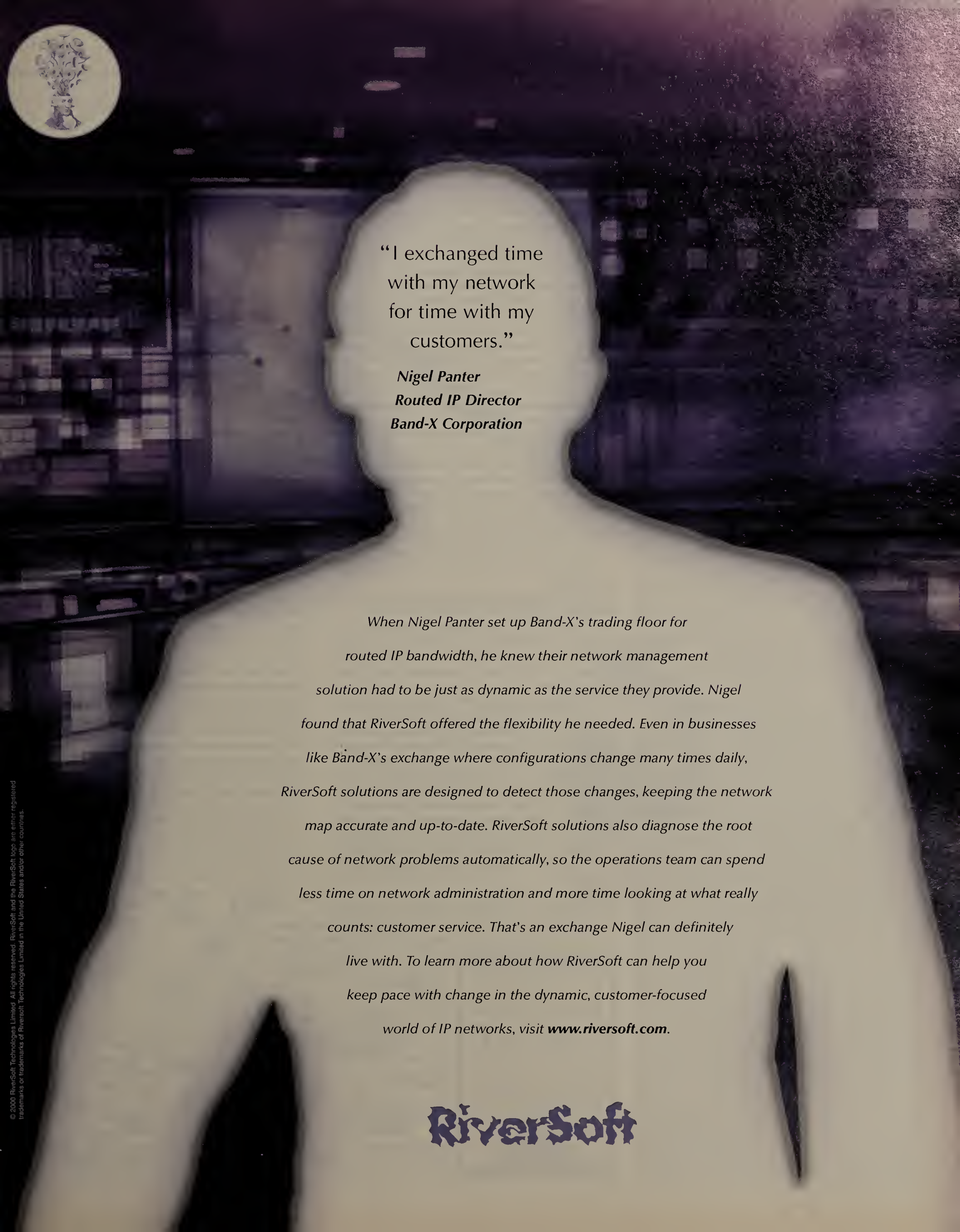

"I exchanged time
with my network
for time with my
customers."

Nigel Panter
Routed IP Director
Band-X Corporation

When Nigel Panter set up Band-X's trading floor for routed IP bandwidth, he knew their network management solution had to be just as dynamic as the service they provide. Nigel found that RiverSoft offered the flexibility he needed. Even in businesses like Band-X's exchange where configurations change many times daily, RiverSoft solutions are designed to detect those changes, keeping the network map accurate and up-to-date. RiverSoft solutions also diagnose the root cause of network problems automatically, so the operations team can spend less time on network administration and more time looking at what really counts: customer service. That's an exchange Nigel can definitely live with. To learn more about how RiverSoft can help you keep pace with change in the dynamic, customer-focused world of IP networks, visit ***www.riversoft.com****.*

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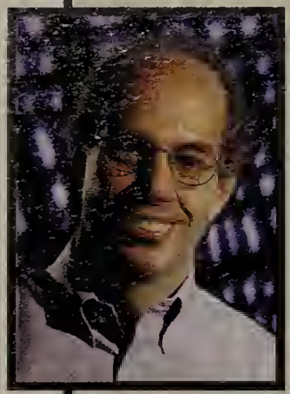
Opinions

Editorial

Novell: Doing a double Lutz on a tightrope

Of all the potential futures for Novell, merging with a consulting company wasn't one that was kicked around much— and maybe for good reason.

By acquiring Cambridge Technology Partners for $266 million, Novell hopes to latch onto a service business that will insulate it from the continuing decline of its core NetWare business, which still accounts for roughly half of its revenue.



CEO Eric Schmidt says Novell's 300 consultants generate about 5% of total revenue today, and when Cambridge's 3,800 employees are added consulting will represent one-third of sales.

But if you take a struggling product firm (first-quarter revenue down 29% to $245 million compared to the same quarter last year) and marry it to a struggling consulting company (loss of $63 million last year on sales that were down 6.6%) does it add up to a win?

There are some things going for it:

- Schmidt remains as chairman, but hands the CEO title to fresh blood, Jack Messman, CEO of Cambridge.
- Consulting services are required with many of Novell's newest products, so the deal is synergistic.
- Novell's cross-platform story means Cambridge consultants don't need to push customers toward forklift upgrades.

And some things are going against it:

- Messman was CEO of Novell Data Systems in 1982 to '83 when the company still sold hardware. He hired Ray Noorda, who came in and jump-started the company by focusing it on software. Is Messman fresh enough?
- Cambridge wasn't a Novell consulting partner, so it doesn't know Novell's products.
- Novell has many consulting partners, including Cap Gemini Ernst & Young and Computer Sciences. Will those relationships sour?
- Cambridge has to maintain its objectivity to remain viable, yet Novell needs it to push product. Schmidt said as much in a statement: "The rich technology and innovative products that Novell is recognized for will now more readily find their way into comprehensive solutions."

As in any acquisition, the key to success will be stitching together a good integrated story. So Novell needs to show it can leverage the deal while letting Cambridge remain product neutral and, at the same time, transition the company as a whole to a service-driven business.

That sounds like a circus act to me.

— John Dix
Editor in chief
jdix@nww.com

Message Queue

AT&T RESPONDS

David Rohde's column "Armstrong: A typical telecom CEO crybaby after all" (www.nwfusion.com, DocFinder 3347) is based on the false assumption that AT&T would deliver local phone service only through its cable system. Our owned and operated cable systems, which cover less than 19% of cable/satellite TV subscribers in the U.S., offer a viable local phone alternative to the regional Bell operating companies. But we've said from the beginning that we would need other means of reaching customers, including leasing unbundled network elements from the Bells. Even where we have cable, switching customers over to cable telephony requires coordination with the Bells.

It's a shame Rohde wasn't actually at AT&T CEO Mike Armstrong's speech at the National Press Club and did not hear the questions and answers that followed. He would have heard Armstrong talk about more than cable's "potential" promise — he also talked about its actual results, including the fact that we are rolling thousands of trucks to connect consumers to cable telephone services.

The five-year anniversary of the Telecom Act was an opportunity to re-evaluate what's occurred since its inception.

Indeed, in one critical aspect of the act, nothing much has changed: Most consumers still do not have a choice of local telephone service providers. The Bells control 95% of the local service market and maintain that stranglehold in part by charging competitors inflated prices for leasing elements of their networks.

The growth of cable telephony is no reason to disregard the Bells' anticompetitive behavior. Consumers and businesses will only experience the benefits of local competition if regulators diligently implement the Telecom Act. One way to level the playing field is to split the Bells into completely separate wholesale and retail operations. That way, any carrier wanting to gain access to a Bell company's networks to offer competing service would be treated the same as the Bell's retail operation.

The Bell companies should only be deregulated after they've been demonopolized. Armstrong's speech was a call to action at a critical time for the industry. It was the right speech at the right time.

Dick Martin
Executive vice president
AT&T
Basking Ridge, N.J.

HEAVY-HANDED TACTICS

Regarding the article "Net execs warn peers about anti-piracy trap" (www.nwfusion.com, DocFinder 3348): The notion that IT managers are "pirates" counterfeiting software deliberately is a mischaracterization of the problem and attributes far more sinister intent to IT managers than reality indicates. The root of the problem is not computer bandits thieving software to skimp on their budgets, but rather the chaotic nature of technology proliferation in the work environment.

Many organizations that can tell you their product inventory to the last nut and bolt shrug their shoulders when asked how much software they have, where it is installed and whether their licensing is sufficient. This carelessness is expensive, not just from the liability it poses when groups like the Business Software Alliance (BSA) go on the warpath, but also in not-so-obvious costs such as spending on unnecessary software and poor IT budgeting.

Good IT asset management practices are good business practices, on par with good accounting practices. Good accountants never fear auditors — companies with good IT asset management practices should have nothing to fear from the BSA.

That said, the BSA's tactics seem more aimed at making examples of relatively innocent companies rather than going after true criminals who are duplicating CDs of Windows in their basements.

The reductions in total cost of ownership and other benefits of good asset management should provide motivation enough for corporate CIOs and IT managers to achieve software license compliance without the BSA's fines and threats of litigation.

Randy Britton
Communications director
Tally Systems
Lebanon, N.H.

E-mail letters to jdix@nww.com or send them to John Dix, editor in chief, Network World, *118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.*

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Totally Unplugged . Ira Brodsky

SMALL NETWORKS: THE NEXT BIG THING

Futurists insist that one day your refrigerator will talk to your PC. I have a recurring dream in which my dog learns to talk. So far, little progress has been made on either front.

But home networks are taking off. As is often the case, the killer application is so obvious most futurists missed it: sharing high-speed Internet access.

Once homes are equipped with access-sharing networks, applications that sounded futuristic become eminently practical. Your pooch may never recite poetry, but with a $60 Webcam you can look in on your favorite canine from the office. And with a $99 wireless transceiver, you can pump Internet radio from your PC to your sound system.

Networks will extend the Web's tentacles to every nook and cranny of the home. In some applications, home networks will reach out to the 'Net for videos, music and e-books. In others, remote services will look in on the home to monitor security, diagnose appliance problems and turn off lawn sprinklers when it's raining.

Entertainment will be the biggest motivation for installing home networks. There are thousands of Internet radio stations to choose from, and sites such as www.live365.com let anyone become a broadcaster. Those with broadband access can get a taste of Internet video at www.ifilm.com.

Education is another key driver. Many schools routinely assign homework involving 'Net-based research. Households with two or more school-age children that can afford the extra hardware will, in the interest of family harmony, set up home networks. Home networks will inspire more schools to offer 'Net-based instruction.

There are three basic network technology options for the home: install new wire, use existing wire or go wireless. While some pundits moan about the lack of a single standard, I suspect home networks will use different media for different purposes. The typical home network could end up looking like a miniature Internet: a "network of networks."

The initial application, sharing high-speed 'Net access, requires about 1M to 10M bit/sec of throughput. The Home Phoneline Networking Alliance standard, HomePNA, uses existing telephone wires and is likely to remain dominant for the next few years.

But wireless LANs could be the ultimate winner. Today, 802.11b wireless LANs run 11M bit/sec, and an upgrade to 22M bit/sec is planned. The 802.11a standard promises speeds up to 54M bit/sec, and vendors speak confidently about extending that to 108M and even 216M bit/sec.

Many say electric power wiring is the best medium for home nets because it covers every room, and most have more than one power outlet. It's best for controlling light switches and, someday, reaching network-capable refrigerators. But HomePNA and wireless will always be faster — and easier to troubleshoot.

Someday your refrigerator will talk to your PC. And you'll never need to find the printed owner's guide, because you'll access it from your Web browser. Now there's a killer app.

Brodsky is president of Datacomm Research in Chesterfield, Mo. He can be reached at ibrodsky@datacommresearch.com.

Above the Cloud . James Kobielus

E-BUSINESS REGISTRIES FACE DEPLOYMENT ROADBLOCKS

Directories make perfect sense for the e-business world. A universal directory would be the ideal "middleman" for brokering e-business relationships and transactions. Buyers and sellers need such middlemen to find each other and conduct business.

So it's exciting to follow industry initiatives that are attempting to define universal e-business directory interoperability frameworks and services, also known as registries. Some of the more promising efforts include the Universal Description, Discovery and Integration (UDDI) consortium, the Electronic Business XML (ebXML) Registry and Repository Working Group and Hewlett-Packard's E-Speak Service Framework Specification (SFS).

Unfortunately, all this activity seems destined to crash into the same roadblock that has kept general-purpose directories from being widely deployed within companies. The most stubborn hurdle, which none of these e-business directory initiatives address, is the need for new directories to coexist with legacy directories — and with directory-like repositories of identity information — inside organizations.

Anybody who has followed the market for metadirectory tools can name the major deployment issues facing e-business registries. First and foremost is the range of legacy directories and line-of-business applications that will have to feed identity information, credentials, profiles and other metadata into externally facing e-business registries. Few companies have given much thought to how they'll synchronize their existing internal LAN/WAN and e-mail directories, much less synchronize with identity, role and permission information in enterprise resource planning (ERP), customer relationship management (CRM), supply-chain management, human resources and procurement applications. Companies need to get their internal metadirectory houses in order before they can provide a regular feed of up-to-date directory information to external business-to-business registries.

FRANCIS BLAKE

Internal corporate politics often put a damper on ambitious metadirectory plans within companies, so it will be no surprise to see trading partners and e-marketplace operators wrangle over business-to-business directory administration issues. Disputes will pivot on issues such as directory data ownership, quality assurance, access control, privacy and replication. Enterprise directory and application administrators will think long and hard before letting critical operational data be hosted and administered outside their organizations and secure intranets.

Another critical issue is the still immature state of metadirectory standards that address Internet-centric business-to-business network environments. The Directory Services Markup Language (DSML) Working Group, an industry coalition, has produced basic directory interoperability specifications that rely on XML syntax and HTTP transports, which are requirements for business-to-business directory integration. But the DSML Working Group hasn't defined a full-featured metadirectory environment. The specification doesn't address the critical issue of DSML-based directory lookups and replication. Furthermore, directory vendors have not implemented DSML aggressively in their products and tools. You'll be hard-pressed to find an ERP or CRM vendor that has implemented DSML.

Even within the rarefied environment of purely business-to-business registries, it's not clear how these environments — UDDI, ebXML Registry, E-Speak SFS and the like — will interoperate. Industry participants are being careful not to commit to one framework and exclude the possibility of future support for other frameworks that may prevail commercially. The ebXML working group has defined a "compatibility wrapper" that lets its registry interface with the UDDI partner and service registries. HP has committed to supporting E-Speak SFS integration with the UDDI and ebXML registries at some later date, although it hasn't specified precisely how it will interface to these competing environments.

During the next few years, one of these e-business registry environments almost certainly will succeed and the others will wither away. Let's hope for a clear winner, so the online economy can converge around a single ubiquitous registry. E-business is already complicated enough. It would be a shame if we had to deploy some kludgy "metaregistry" infrastructure to bridge competing business-to-business trading communities.

Kobielus is an analyst with The Burton Group, an IT advisory service that provides in-depth technology analysis for network planners. He can be reached at jkobielus@tbg.com. The opinions expressed are his own.

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SAN meets

Optical repeaters, DWDM and storage over IP are extending SANs over the wide area.

BY CHARLES CLARK

WHEN RICK NELSON WENT TO WORK at EchoStar/DSSH Networks in Denver in 1997, the senior IT architect had a design for a storage-area network, but unfortunately, storage vendors did not have the hardware to make that design a reality.

But the storage needs of the satellite services company continued to grow in size and complexity until a SAN became a necessity. Nelson learned that Computer Networking Technology (CNT) of Minneapolis was working with storage powerhouse EMC on a way for customers to use EMC's Symmetric Remote Data Facility (SRDF) software to replicate data over several hundred miles.

That was exactly what Nelson needed because EchoStar was building a disaster-recovery center in Gilbert, Ariz. CNT uses proprietary software to convert SRDF data frames to IP packets, which are then sent over the WAN using CNT's optical extenders.

In phase one of the SAN project, EchoStar experienced a 500% improvement in the time it took to do local tape backup. Even more importantly, EchoStar could send key company data to the disaster-recovery center, including information about EchoStar's five million customers, a data warehouse that is used for strategic analysis, Oracle Financials, and commission information about EchoStar's dealers.

Nelson says the new SAN is a vast improvement over the company's previous method of protecting its data, which consisted of "making a copy of our tapes, putting those tapes off-site and praying that nothing happens." As Nelson says, when your company's storage requirements are growing at the rate of 450% per year, and you expect to be managing 40 terabytes of storage by the end of 2001, that type of solution just won't cut it.

EchoStar is one of a growing number of companies taking advantage of new technology that can extend a SAN over long distances.

The business drivers behind this demand for longer range SANs fall into two categories: metropolitan-area networks and WANs.

First, the demand for midrange metropolitan-area networks is coming from financial institutions and large companies that want to move data out of what they consider to be dangerous areas — areas susceptible to floods, earthquakes and other natural disasters.

For example, financial institutions and financial services companies in New York typically want to move data from Manhattan to New Jersey or neighboring states to protect it from disastrous power failures. Initially, these institutions solved the problem by shipping the data via tape to New Jersey, but when the data explosion of recent years began, this procedure became impractical, and these companies looked for another way.

They found it in the form of extended SANs — that is, SANs that could be extended with optical networking equipment so they could cover distances of up to 120 kilometers, rather than being restrained by the 10 kilometer Fibre Channel limit.

These devices come in two forms — extenders or repeaters, such as the OptiLink 2000 by Finisar; and wave division multiplexers (WDM) and, more recently, dense wave division multiplexers (DWDMs) from ONI Systems, Nortel Networks and ADVA Optical Networking.

Although there is currently much more activity in the metropolitan-area market than in the WAN, over time the demand for transporting storage over WANs is expected to far surpass metropolitan networks, especially when the data is transported over IP, says Steve Duplessie of the Enterprise Storage Group.

He says that transporting storage data over IP is one of the most significant trends in storage today. "The reason this is an important technology is that ultimately it's going to let users have a choice — a choice between building storage networks on an Ethernet infrastructure that they already have or building a separate storage network based on Fibre Channel. Up until now there has been no choice for users — they had to build a Fibre Channel-based storage network."

IP storage networking offers several advantages to users. These include protecting more data than was possible before, deploying more information anywhere, utilizing users' investments in existing IP network infrastructures and supporting WAN distances.

There are currently three different ways to transport storage data over IP:

- SCSI over IP, supported by Cisco, Adaptec and IBM.
- Storage over IP, supported by Nishan Systems.
- Fibre Channel over IP standard, supported by CNT, Gadzoox, Cisco, Vixel and Lucent.

SCSI over IP works by having a host-resident agent encapsulate SCSI data in an IP packet, and tunneling that encapsulated packet through the TCP/IP stack. The encapsulated packet then goes out to the IP network through the network interface card. At the receiving node, the IP packet is unwrapped by an external router and converted back into SCSI data.

Nishan Systems' Storage over IP converts Fibre Channel to IP outside of the server and bypasses the TCP/IP stack in the host, eliminating the stack overhead in the process. Storage over IP runs SCSI block-level commands over User Datagram Protocol (UDP) and IP, and, overall, provides an inexpensive storage wide-area networking solution.

The Fibre Channel-over-IP specification supports Fibre Channel tunneling over IP networks. Under this proposed standard, routers connect Fibre Channel SANs to IP networks.

In terms of products on the market today, CNT offers UltraNet Direc-

WAN

Rick Nelson, senior IT architect at EchoStar, is extending his SAN to disaster-recovery sites in Cheyenne, Wyo., and Gilbert, Ariz.

PHOTO: DON CLOONEY

NetworkWorld TECHNOLOGY INSIDER STORAGE

tor, a multiprotocol platform that can provide cell switching in the case of Fiber Channel over ATM and packet-switching in the case of Fibre Channel over IP.

The SAN community is waiting anxiously for Cisco to announce its storage router product in April. Cisco purchased NuSpeed, a start-up with an innovative storage router, last August, within days of the official introduction of its product. During the past few months, Cisco has been rigorously testing the NuSpeed router, according to Marc Cree, general manager of Cisco's Storage Router Business. Cisco initially will support the SCSI-over-IP and Fibre Channel-over-IP protocols, Cree says.

Many industry analysts expect Cisco to jump into the storage networking field in a big way after the introduction of its storage router. Given Cisco's past history, these analysts expect the company to aggressively acquire other companies for technology and products.

Nishan, located in San Jose, has created a lot of buzz with its storage-over-IP technology. So far, Nishan has introduced several storage-over-IP products, including the IPS 1000 Series gateway, the IPS 2000 Series entry-level enterprise switch that connects SCSI hosts to storage over IP Ethernet-based SANs, the IPS 3000 Series eight-port Fibre Channel switch, SANvergence Manager for managing IP storage fabric, and Configuration Manager, a graphical user interface-based software product managing SCSI-only environments.

Entrada has come out with its Silverline storage router. Later this year, Entrada will introduce several products, including optical components. Next year, these components will come together to provide the integrated solution to which the company has committed itself.

FalconStor of Melville, N.Y., offers the only pure-play software SAN over IP solution. Called IPStor, this product offers virtualization, storage management, IP connectivity via Gigabit Ethernet, and security.

The Implementors

In terms of implementing medium- and long-range SANs, it appears this task will fall to the major storage providers. EMC, Compaq and Hitachi are in the best position to tackle this job because each company, usually working with CNT, has already installed several storage networks in a production environment or worked extensively with them in a test-bed environment.

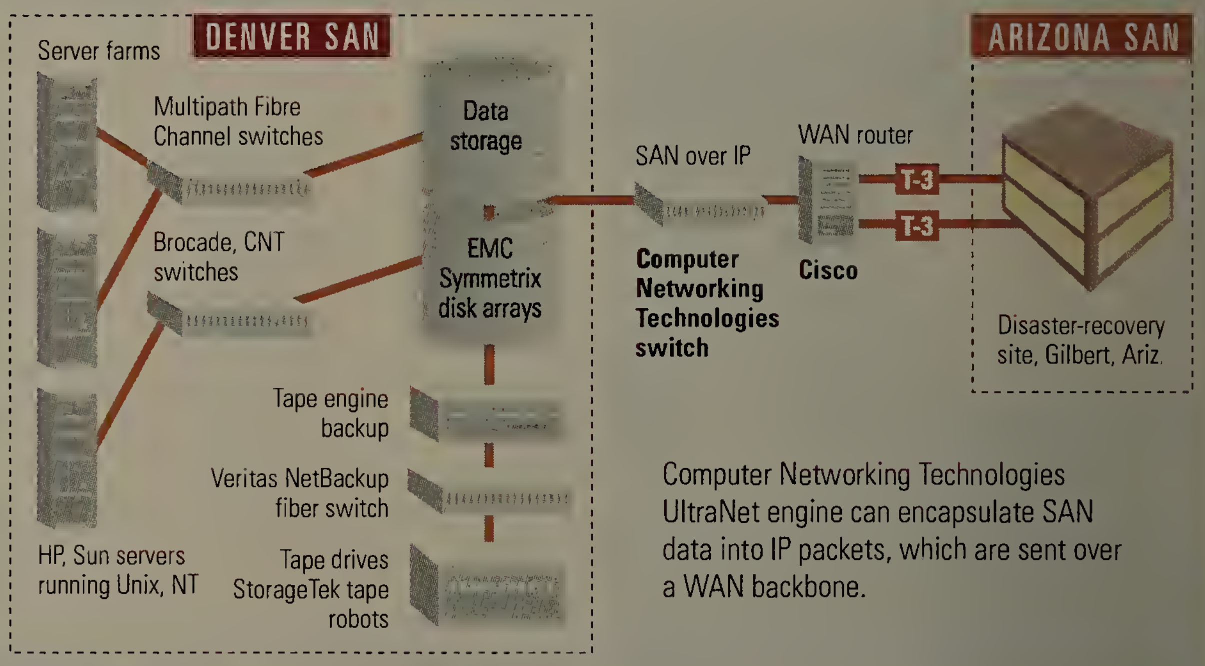
Compaq has worked with CNT to install Fibre Channel over ATM and Fiber Channel over IP. Compaq has also worked with ADVA, Nortel and ONI to qualify and, in some cases, install WDM and DWDM optical metropolitan networks. Like EMC, Compaq has a remote replication product, Data Replication Manager. Compaq also has a product for remote backup that can be implemented on a storage WAN.

Like EMC and Compaq, Hitachi has a complete suite of software applications that gives users the ability to perform remote backup, long-distance replication and data movement over distance.

Sun, IBM and Hewlett-Packard will follow closely on the heels of EMC, Compaq and Hitachi. These companies have the technology, marketing and sales expertise. They also have the alliances with the component suppliers in the optical and the IP area to make a major impact. ◪

Long-distance SAN

EchoStar, a Denver direct broadcast satellite TV company, is planning to transmit storage-area network data to a disaster-recovery site in Arizona.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Brocade, CNT switches
EMC Symmetrix disk arrays
Tape engine backup
Veritas NetBackup fiber switch
HP, Sun servers running Unix, NT
Tape drives StorageTek tape robots
SAN over IP
WAN router
T-3
T-3
Computer Networking Technologies switch
Cisco
ARIZONA SAN
Disaster-recovery site, Gilbert, Ariz.

Computer Networking Technologies UltraNet engine can encapsulate SAN data into IP packets, which are sent over a WAN backbone.

ESCAPE FROM NEW YORK

MANY TOURISTS, AFTER SPENDING A DAY IN NEW YORK, can't wait to escape from the frenetic pace of the Big Apple. Financial institutions in New York feel the same way about their data. They can't wait to get it off the island of Manhattan and escape the possibility of a power failure or some other catastrophe that might disrupt their IT operations and result in lost or corrupted data

Financial executives were less than satisfied with transporting tapes by truck to New Jersey each day. As a result, the IT departments at these institutions prayed for a better solution, and those prayers were answered when StorageNetworks set up shop in Manhattan.

Almost as soon as StorageNetworks opened its doors, it began to receive inquiries from some of the city's largest financial institutions about transporting storage data from data centers in Manhattan to remote facilities in New Jersey.

Working with partners Brocade Communications and ONI Systems, Mark Kincaid, vice president of network engineering, found a solution — an optical ring that extended the distance limitation of Fibre Channel from 10 kilometers to 120 kilometers.

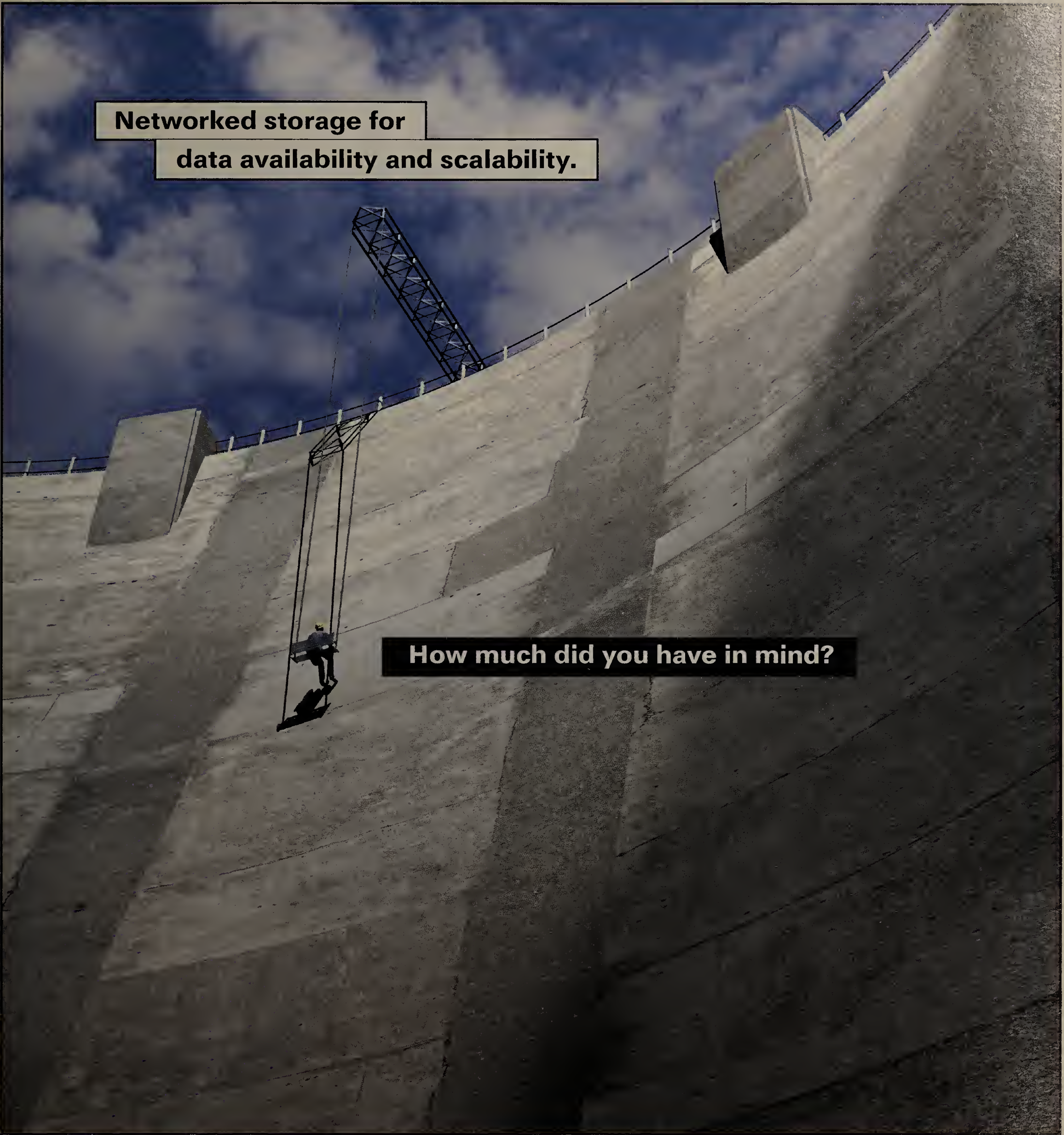
The ring runs from New York through the Holland Tunnel to Weehawken, N.J. From there, the fiber in the ring runs south to Jersey City. From Jersey City the fiber runs through the Lincoln Tunnel. This ring permits StorageNetworks to provide services such as remote replication, remote backup, disaster recovery and business continuance located in Manhattan.

The heart of the optical ring is a protocol-independent dense wave division multiplexer (DWDM) with two strands in and two out. The DWDM permits StorageNetworks to run 30 1-G bit channels (wavelengths) or 30 2.5-G bit channels down the two fibers. According to Kincaid, this is equal to 30 host bus adapters on the ring.

Spurred on by its success in New York, StorageNetworks is deploying similar optical metropolitan networks in other U.S. cities. And its success has inspired other storage service providers to do the same.

In the meantime, StorageNetworks' customers, who are connected to the company's optical ring, can rest easy because they have a safe place for their data in New Jersey. And, if a power failure occurs, the company has a sound business continuance policy in place.

— Charles Clark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Sizing up storage alternatives

Our lab tests find your best performance bet when considering local, NAS or SAN-based storage varies with your application and network requirements.

BY EDWIN MIER AND KENNETH PERCY, NETWORK WORLD GLOBAL TEST ALLIANCE

IT WASN'T LONG AGO that IT professionals shrugged off storage as a straightforward, albeit very boring, aspect of maintaining a computing infrastructure. But in the last few years, a push towards shared enterprise storage has given rise to several deployment options.

For instance, when does a network-attached storage (NAS) device do a better job storing hordes of enterprise data than a storage-area network (SAN)? And, how do these newer technologies compare with local storage, where a hard disk is directly accessed by a server via a SCSI cable connection?

NetworkWorld TECHNOLOGY INSIDER STORAGE

With the help of leading switch maker McData and leading server vendor Compaq — which both contributed components of our storage testing infrastructure — Network World Global Test Alliance partner MierCom kicked the competitive tires of these storage technology alternatives to see how performance varied across several common storage scenarios.

Our test bed was set up to loosely emulate file servers, Web servers, video servers and other application servers with regard to the data they routinely transfer to and from a storage location. We varied the storage location between a local SCSI-attached disk drive, a disk drive on a storage server across a Gigabit Ethernet LAN, and a disk drive in a SAN disk array connected over a Fibre Channel SAN.

Which setup worked best? It depends. Our tests show the right storage route to take depends on the storage network environment, the size of the files being stored or retrieved, the type of PCI bus connection, and how your users access the stored data.

Specifically, our tests indicate that:

- The NAS environment — where data moves between a server "initiator" and a storage "target" over a Gigabit Ethernet network — can deliver better data-transfer performance than a SAN in certain cases, such as when file sizes are small.
- SANs really outperform the NAS alternative when data reads or writes are sequential and file sizes are large, such as when a server is delivering streaming video, or when a server is backing up large data volumes.
- When connecting a server to a SAN, performance is virtually the same whether the SAN adapter uses a 32-bit or 64-bit PCI-bus connection.
- For a Gigabit Ethernet network interface card (NIC) in our NAS environment, performance was typically better via a 64-bit PCI-bus connection than a 32-bit PCI-bus connection. But the difference isn't much — only about 10% in our tests.

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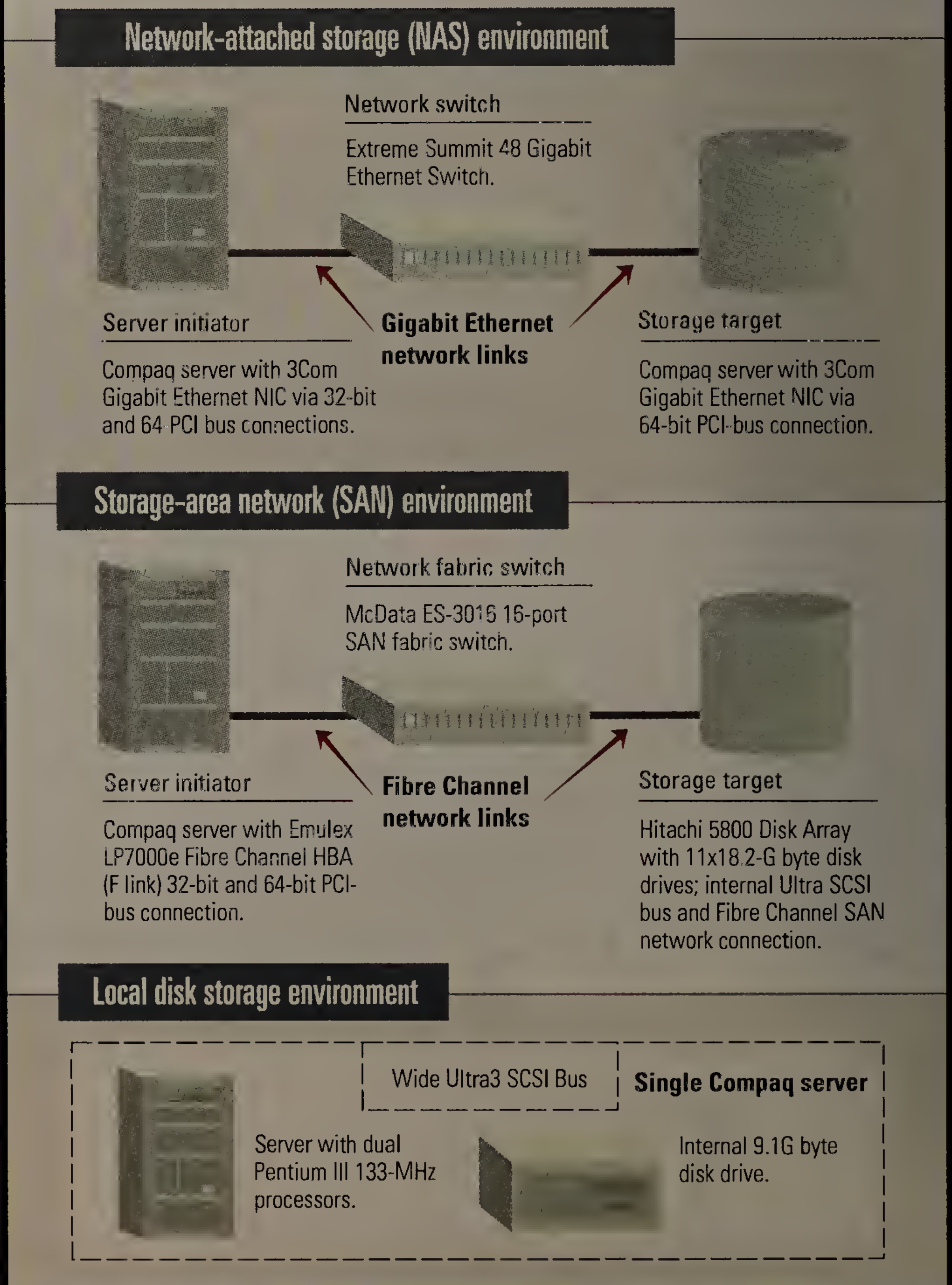
Figure 1: Head-to-head storage comparison

In our comparison of competing storage technologies, we set up the following three test beds to measure the effectiveness of each deployment option.


Network-attached storage (NAS) environment
Network switch
Extreme Summit 48 Gigabit Ethernet Switch.
Server initiator
Compaq server with 3Com Gigabit Ethernet NIC via 32-bit and 64 PCI bus connections.
Gigabit Ethernet network links
Storage target
Compaq server with 3Com Gigabit Ethernet NIC via 64-bit PCI-bus connection.
Storage-area network (SAN) environment
Network fabric switch
McData ES-3016 16-port SAN fabric switch.
Server initiator
Compaq server with Emulex LP7000e Fibre Channel HBA (F link) 32-bit and 64-bit PCI-bus connection.
Fibre Channel network links
Storage target
Hitachi 5800 Disk Array with 11x18.2-G byte disk drives; internal Ultra SCSI bus and Fibre Channel SAN network connection.
Local disk storage environment
Wide Ultra3 SCSI Bus
Single Compaq server
Server with dual Pentium III 133-MHz processors.
Internal 9.1G byte disk drive.

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- In all cases, writing data to a storage device takes more time and resources than reading it, and subsequently yields much lower data-transfer performance.
- With random data reads — when there's no correlation between data from one read to the next — data-transfer performance is much lower than sequential reads of large data files in all scenarios we tested.
- With random reads, data-transfer performance over a Gigabit Ethernet NAS is nearly as good as reading data from a local disk drive on a SCSI bus.

The data presented is, we believe, among the first such published storage-comparison results. Still, we caution readers to keep two points in mind.

First, these results are based on the particular equipment we deployed. A SAN disk array other than the Hitachi 5800 we used, for example, might exhibit different performance characteristics.

Second, due to the broad differences between SAN, NAS and SCSI environments, the results should not necessarily be viewed as perfect apples-to-apples comparisons. For example, while direct SCSI data storage exhibits the best data-transfer performance in some scenarios, it is not generally accessible by multiple servers concurrently, as stand-alone storage nodes in the NAS or SAN environments are.

Also, while we used an off-the-shelf Compaq server as a NAS storage target, we employed a specialized Hitachi Disk Storage Array as the target node in the SAN environment. There are specialized NAS storage nodes available, too, but our attempts to procure one for this testing were unsuccessful.

How we did it

The test scenarios we created involved an application-processing server, which, depending on the application, could be an e-mail server, Web server, database server or video server. This server was the initiator of each storage operation, meaning that it issued all disk read and/or write requests.

Those requests were sent to and processed by a storage target, which varied depending on the environment. In the NAS environment, the storage target was a Compaq ProLiant server, accessed via an IP-based Gigabit Ethernet network. In the SAN environment, the storage target was a Hitachi 5800 Disk Array, which was built for the purpose of being a SAN node. In the SCSI environment, the storage target was one of the application server's internal disk drives.

As detailed in Figure 1 (see page 60), we used the same Compaq server configuration as the initiator in all the scenarios. This was a fairly robust Compaq ProLiant ML370, with dual 866-MHz Pentium III processors and 1G byte of RAM.

We only changed the initiator server configuration when we changed from a NAS to a SAN environment. Then we replaced the 3Com Gigabit Ethernet NIC with an Emulex LP7000e host bus adapter.

In the SAN and NAS environments, we also compared data-transfer performance between 32-bit and 64-bit PCI-bus connections. This was the connection inside the application server used by the Gigabit NIC and the SAN host bus adapter. The 3Com Gigabit NIC we used, model 3C985B-SX, can be plugged into a 32-bit PCI slot or 64-bit PCI slot within the Compaq server. The Emulex LP7000e HBA comes in different models for 32-bit and 64-bit PCI-bus connections.

The SCSI environment is not affected by whether a Gigabit Ethernet or Fibre Channel storage network is in place. The internal disk drive was directly SCSI-bus-connected to the processor motherboard of the Compaq server. No network I/O or NICs were involved.

Another key component to this testing was a sophisticated, public domain software test tool from Intel called Iometer. This software is well suited for this mixed-technology environment because it measures and reports average data transfer in megabytes per seconds — whether the data is being sent to a local SCSI-connected disk, out over a Gigabit Ethernet network via a NIC or out over a SAN via a host bus adapter. Iometer issues disk reads and/or writes to any defined disk drive, which can be a local drive or a network drive mapped to a NAS node, or a drive on a remote SAN disk array. Iometer, which consists of client and server software components, can also perform the same tests across multiple platforms concurrently and consolidate the results, or it can perform a test via multiple "threads" — instances of the same software process running concurrently and independently — on the same processor. This was the method we used for running two and five servers against the same storage target at the same time.

Scenarios

In our research on how to characterize different real-world storage applications, we found that storage scenarios vary in three regards: the relative percentage of storage requests that are reads vs. writes; whether disk access is random or sequential; and the typical file size. Based on this information, we developed five scenarios for this comparative testing.

In our first file-server scenario, we designed the server to imitate an application server, such as an e-mail or file server, that conducts many, typically small, reads and writes continuously. This scenario is characterized by 80% reads, 20% writes. File size is fixed at 4K bytes, and disk access is random in all cases. This scenario tests how well small files can be served across a Gigabit Ethernet network vs. a Fibre Channel SAN.

The cumulative data-transfer rates achieved in this scenario (see Figure 2, below) are relatively scant — less than 1M byte/sec. This is the impact of moving fairly small files, running a mix of reads and writes and using random disk access, all of which tend to slow things down. In this scenario, data-transfer performance for all three storage environments is fairly comparable. It is only when five or more servers are collectively accessing the disk storage that the SAN environment provides slightly greater aggregate throughput. A SAN might be a slightly better choice in this type of scenario, but only if you expect

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Figure 2: File server scenario one

In this series of tests, we measured how different storage technologies handle an application server reading and writing small files (4K bytes) to a target storage device. We ran tests with one, two and five servers initiating the storage operation.

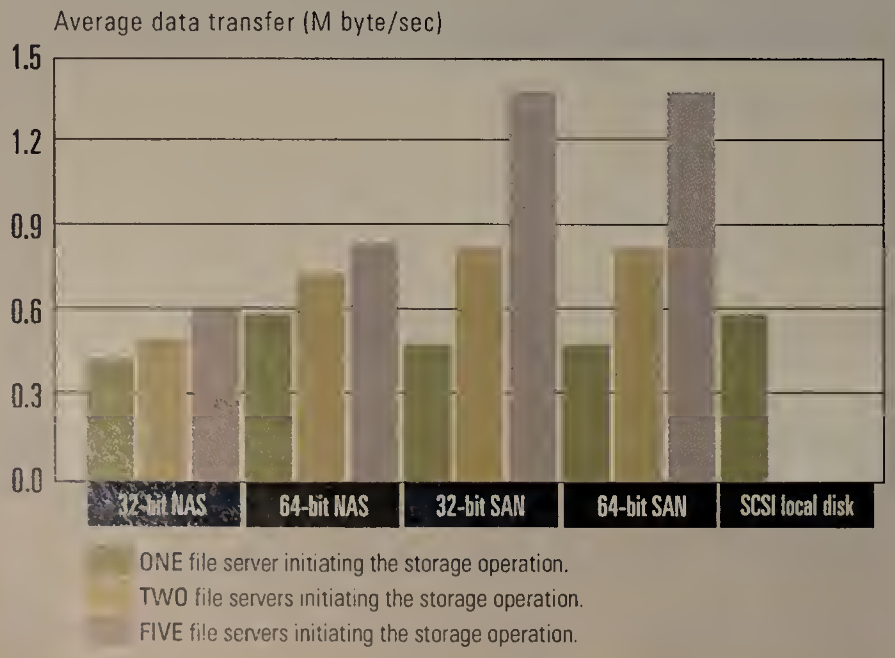
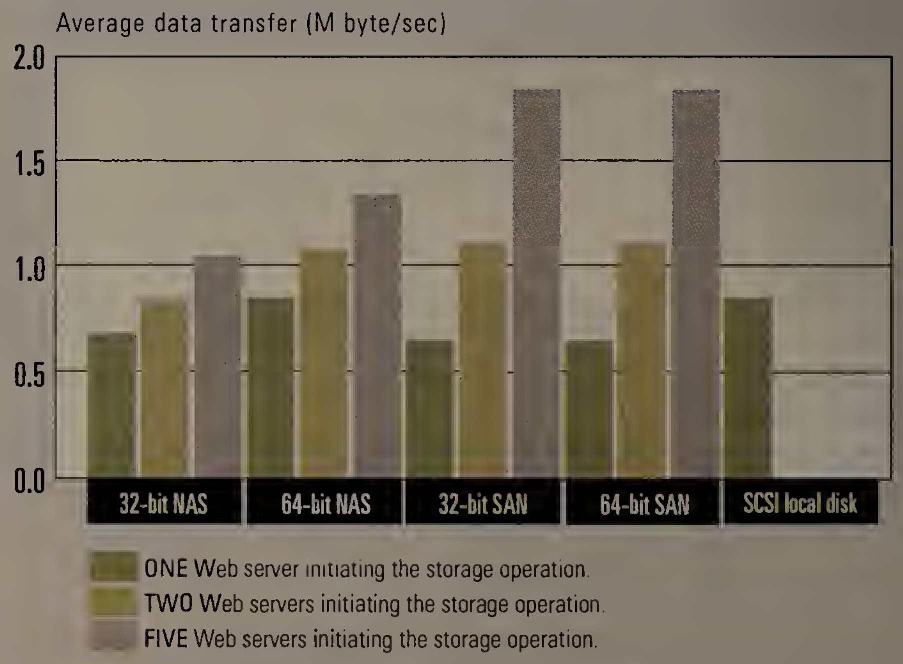


Figure 3: File server scenario two

In this series of tests, we measured how the different storage technologies handled an application server reading and writing a mix of a small and large files (4K bytes, 8K bytes and 16K bytes) to a target storage device. We ran tests with one, two and five servers initiating the storage operation.



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to have multiple servers concurrently accessing the same disk storage.

Our second file-server scenario (see Figure 3, page 62) was similar to the first with one exception. Rather than fixing all the file sizes at 4K bytes, we also included larger file sizes as 10% were 8K bytes and another 10% were 16K bytes. This scenario tested how the storage alternatives compared with some larger file sizes added in.

Our tests with this scenario showed that, as file sizes increased, data-transfer throughput also increased. As with the first file-server scenario, though, there was no clear winner between NAS, SAN or local SCSI disk. It's noteworthy that, even with five servers collectively accessing the same disk storage, only 1% to 2% of the Gigabit Ethernet or Fibre Channel bandwidth was used. This means the transport capacity of Fibre Channel and Gigabit Ethernet is huge.

In our third scenario, one, two and then five Web servers were serving the same set of Web pages and files. All disk operations are reads; all disk access is random. File sizes were variable, ranging from 20% very small (512 bytes) to 10% fairly large (128K bytes). This scenario showed how well Web pages can be served over the different storage/transport options.

We were surprised with the results of our testing with this scenario (see Figure 4, right). Given random-access retrieval of a range of file sizes, data-transfer rates achieved in the NAS environment clearly outperformed the SAN. Indeed, the NAS throughput was roughly double the SAN throughput in all cases. And despite the hype concerning the throughput speed offered by SANs, it was surprising to see Gigabit Ethernet perform so much better than Fibre Channel SANs in any situation.

In our fourth scenario, one, two and five video servers delivered streaming video. As with the previous scenario all disk operations were reads. However, all disk access here is sequential. The same 64K-byte file size was used in all cases. This scenario tested the relative performance of serving streaming video over the different storage/transport options.

When comparing the video server scenario with the results of the Web server scenario, we saw the opposite result (see Figure 5, below). With sequential disk access to large files, and consistent, fairly sizable files, the SAN environment outperformed the NAS alternative by a considerable margin — from more than double for a single video server, to nearly four times the throughput when five video servers were reading the same disk files across the SAN or NAS. In the case of five video servers, the cumulative SAN throughput, 47M byte/sec, tapped roughly half the Fibre Channel SAN's bandwidth. These tests indicated that if you are going to serve large amounts of video from a shared-storage node, your best bet is a SAN deployment.

In our final scenario, one, two and five application servers were writing folders and directories to the storage target in large, 1M-byte files. All disk operations were writes, and disk access was 100% sequential. This scenario tests how well large files are transported and written sequentially to a back-up storage disk, emulating server backup to tape.

In this scenario applications servers were writing massive amounts of sequential data to a storage target's disk (see Figure 6, below). In the NAS and SAN environments, it seemed the maximum disk-write-throughput point might have been reached because the storage data-transfer rate did not increase with two or more servers, compared with a single-server initiator. With the Hitachi 5800 disk array in the SAN environment, the peak we reached was about 30M byte/sec; with the Compaq NAS server the write capacity to a single disk peaked at about 5M byte/sec. The specialized SAN storage node clearly outperformed the off-the-shelf server acting as a NAS node in our test bed. We don't know how well a specialized NAS device would have

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Figure 4: Web server scenario

In this series of tests, we measured how the different storage technologies handle a Web server randomly reading and writing files of various sizes to and from a target storage device. We ran tests with one, two and five servers initiating the storage operation.

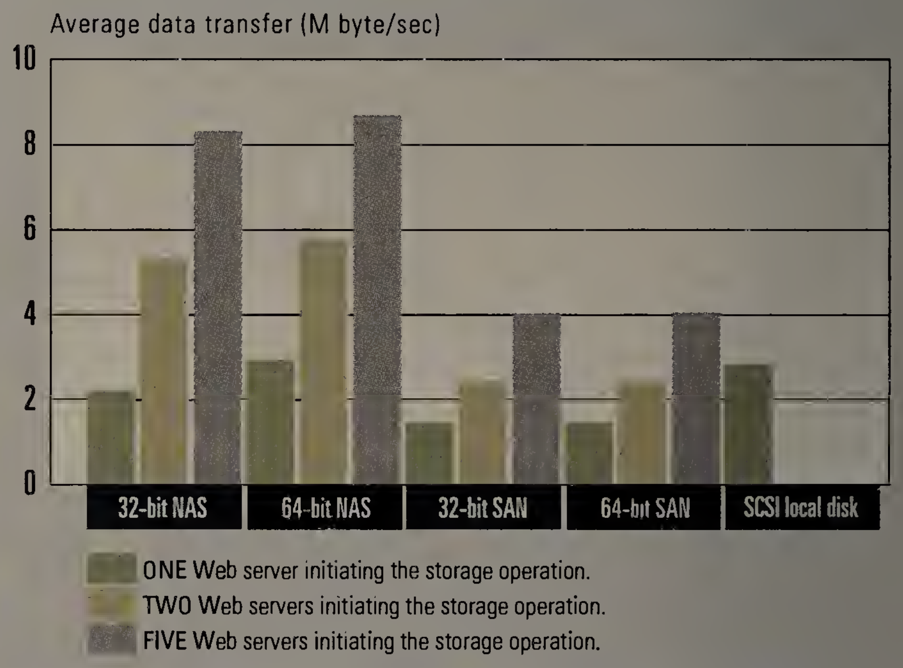


Figure 5: Video server storage scenario

In this series of tests, we measured how the different storage technologies handled a video server sequentially reading large video files (64K byte) from a target storage device. We ran tests with one, two and five servers initiating the storage operation.

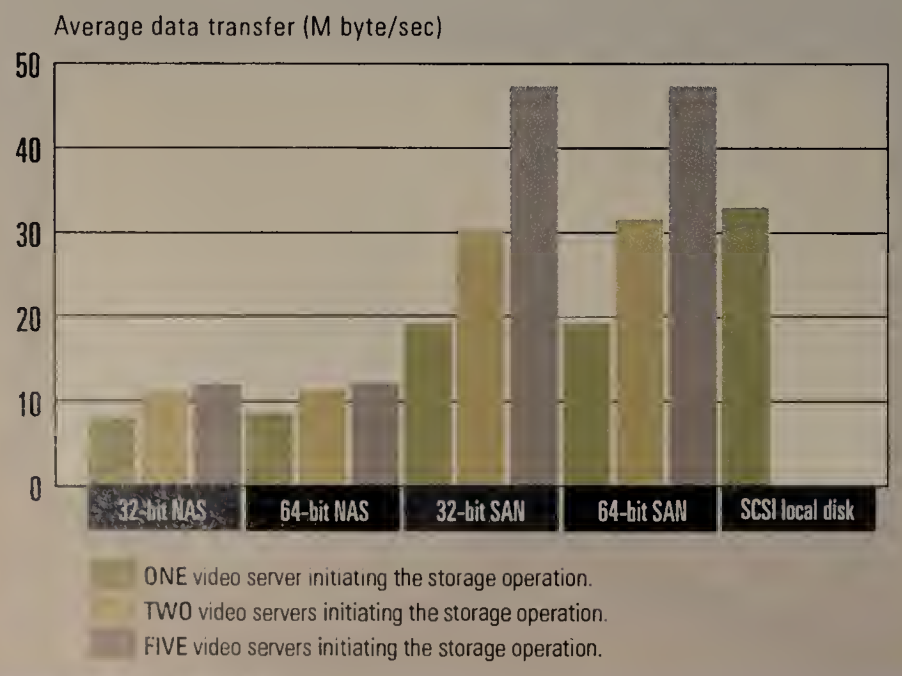
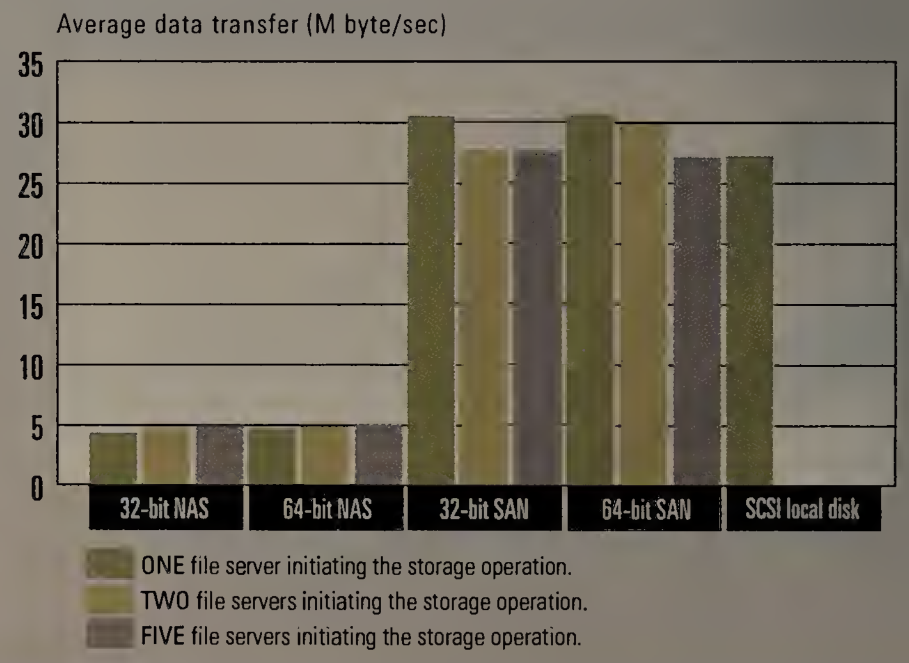


Figure 6: Back-up server storage scenario

In this series of tests, we measured how different storage technologies reacted when an application server wrote files to specified directories on a target storage device. We ran tests with one, two and five servers initiating the storage operation.



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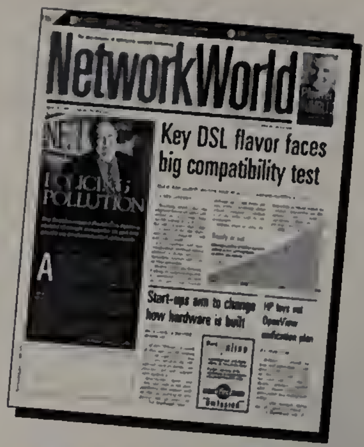
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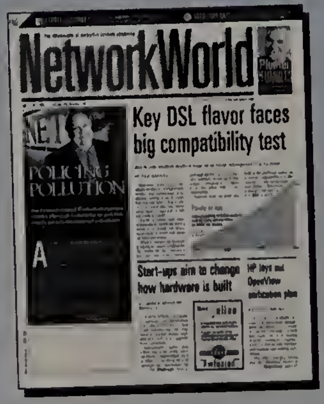
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fared by comparison, but given these two storage nodes, the SAN alternative delivers much better performance.

The SCSI option did well here, for backing up a single server. Indeed, performance was comparable to doing backup over a SAN. However, a key motivation to doing a backup in the first place was to create and maintain a copy of a server's data in a location where it would be safe if something took out the server. Local SCSI doesn't accomplish that end.

In the end

There are many other scenarios that could still be tested. For example, it would be interesting to see how data-transfer performance compares if disk storage was striped across multiple target disk drives, instead of just one. It would also be interesting to see how different, specialized storage nodes — such as those from Network Appliance in the case of NAS, or EMC in the case of SANs — perform by comparison. However, neither vendor was willing to participate in this novel test bed.

The data presented represents a first step toward quantifying which of the various storage alternatives does the best job for a particular set of requirements.As our testing shows, there are cases in which each delivers the best relative data-transfer performance.

It is clear that, as far as storage technologies go, one size does not fit all. Indeed, the moral of this story may be that users need to gain a better understanding of their storage needs before they sign on the bottom line for a SAN or NAS-based storage network.

Mier is founder of Miercom, a network consultancy and product test center in Princeton Junction, N.J. Percy is lab test engineer for storage systems at Miercom. They can be reached at ed@mier.com or kpercy@mier.com.

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Testers Choice . Thomas Henderson

MEASURING HOW FAST IS REALLY, REALLY FAST

In computing, there are two perennial testing issues. They address speed and compatibility. When you consider how many facets there are to a modern PC and its communications infrastructure, testing performance and compatibility can be a wickedly difficult science.

In the early days of IBM clones, compatibility tests boiled down to whether or not a PC could run Lotus 1-2-3 out of the box and support Microsoft's Flight Simulator. System performance was measured by obscure but discrete metrics such as how many Fibonacci numbers could be calculated.

As the PC benchmarking game evolved, several trade magazines attempted to develop hardware and network performance measurements while vendors took a crack at their own measurements. But because most were developed in a vacuum, few standard test methodologies existed.

While performance and compatibility measurements at the desktop are important, networking PCs now also raises questions about system throughput and elasticity from end to end. There's good news and bad news about systems testing. Real-world performance numbers have traditionally been hard to come by. However, recent benchmarking efforts do seem to provide performance numbers that are much closer to the real world because they use tunable simulations rather than pristine — even bleached — platforms.

Two prominent (although largely vendor-driven) organizations exist: Standard Performance Evaluation Corporation (SPEC) and Benchmark and Performance Corp. (BAPCo).

SPEC provides a number of tests that simulate characteristics ranging from battery consumption to the number of Java browser transactions that can be performed per unit of time. SPECWeb99 and SPEC JBB2000 are two examples of platform simulators that measure the madness that network and Web operations centers go through.

While SPEC derives measurements from simulations, BAPCo uses real-world applications that have been "frozen together" in amalgamations to measure desktop characteristics and Internet content creation via its SYSmark2000 tool. A user's Internet experience is now measured by BAPCo's WebMark2001, which can be useful in the quest to measure the ever-important impatience point of Web performance.

I'd be remiss in talking about benchmarking without mentioning NetBench, ServerBench and WebBench from eTestingLabs. These tools, while not as honed as those from BAPCo and SPEC, deliver meaningful but confined analysis of their respective targets.

All transactional benchmarks today have a staggering variety of tuning options. The number that's often proffered as a vendor-competitive metric may have an enormous amount of confining characteristics used in testing to deliver the optimal result. The devil is in the details, and most benchmarks now include full disclosure statements. When determining whether or not The Number has any meaning in your network, make sure you read all the fine print.

Henderson is principal researcher for ExtremeLab of Indianapolis. He can be reached at thenderson@compuserve.com.

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Peer pressure

IT teams often bypass management and deal with slacking co-workers themselves.

BY STEVE ULFELDER

ILLUSTRATION: RICK SEALOCK

IN a former job, Bala Nair once had a new co-worker who just wasn't getting with the program. Other team members were working overtime and mopping up after the newbie, who was talented but had never before worked in a structured environment. The morale of the five-member team was suffering, says Nair, who's now a senior architect at Intranets.com in Woburn, Mass.

Sounds like a job for management, right? Wrong. Rather than bring the situation to a supervisor, Nair's team asked the group leader to "sit down with the person and say, 'In order to fit with the team, here's what you need to do.'" After several meetings with the leader over four months, that worker became a productive contributor. "It was a bit like teaching manners to an unruly puppy," Nair says.

Everybody's experienced a dead-weight co-worker or two. These slackers may get by with charm, or they may simply stonewall. If their managers fail to improve their performance, experts say you need to address the problem head-on.

A network administrator at a midsized Ohio company, who requested anonymity for herself and her employer, remembers a 1999 hire "who just sat in his cube . . . he wouldn't do anything."

Today, when employers can't hire network professionals fast enough and struggle to retain them, such co-workers are an unpleasant fact of life. Moreover, increased emphasis on self-directed teams makes it easier for loafers to slip under management's radar, says Christopher Rotolo, a partner at consulting firm Behavioral Insights.

Take charge of the situation

If managers don't pick up on the problem, it's usually up to the peer group to straighten out colleagues. Lena West, president of xynoMedia Development, a human resources and technology consultancy, says, "Managers need to be involved only when there's sexual harassment or [a similarly serious issue], not just when so-and-so's not pulling his weight."

In Nair's situation, his former employer strongly emphasized teams, which is why the group leader, rather than a manager, was chosen to discuss the problem with the co-worker whose work wasn't up to par.

Contrast that approach with the Ohio network administrator who kicked the problem upstairs. She says the slacker's busy manager blew off the situation. Other co-workers, hesitant to confront their colleague, simply absorbed his work — and resented him.

Nair's team made the right decision in electing a single representative to meet with the co-worker.

"You want to make sure the person doesn't get that ganged-up-on feeling," Rotolo says.

When beset by a group, West says, the first thing that occurs to the aggrieved party is, " 'All of you talked about me behind my back.' This destroys trust."

If you draw the short straw, you might want to make notes and enter the meeting with a list of points. That's because it's easy to forget what you wanted to discuss, especially if your co-worker turns emotional or belligerent.

Experts say you should also bring an open mind. "I go in with the idea that I may be wrong," West says. "If you think you're right, you won't be willing to see the other point of view."

The first goal is to determine the cause of the problem. If you go in with the attitude that your colleague is a professional loafer, you may miss signals pointing to insufficient training, or a health or family issue.

So you're there with your list and your open mind. Experts say the actual discussion should draw from basic management techniques for offering feedback.

Make that feedback as specific as possible. "You don't say, 'You always do this,' or 'You have a bad attitude,'" Rotolo says. "You'd say something like, 'In project X, you had this deadline. You didn't meet that deadline, and when you did finish, your project was buggy.'"

You should also frequently point out that the behavior is harming the team. Once again, use details.

You might point out that other members of the group have worked excessive overtime, or that a poorly executed project that can be traced to the coworker in question was mentioned in your performance review.

Once you've had your say, don't expect miracles. Your co-worker may grow sullen or lash out. In such cases, experts say, you should gently but doggedly return to the specific concerns on your list.

If the co-worker does come around and admit that he has been slacking, be prepared to help correct the situation. Once again, specifics are important.

For example, Rotolo says, "If [your co-worker is] going through a divorce, maybe you make an informal contract. . . . Tell him the rest of the team will cover for him for a certain period of time, but spell out the consequences if he doesn't get it together after that."

Of course, sometimes nothing works and you cross your fingers. In the case of the slacker at the Ohio company, "he quit after his first performance review," his former co-worker says. "Thank God."

Ulfelder is a freelance writer in Southborough, Mass. He can be reached at sulfelder@ charter.net

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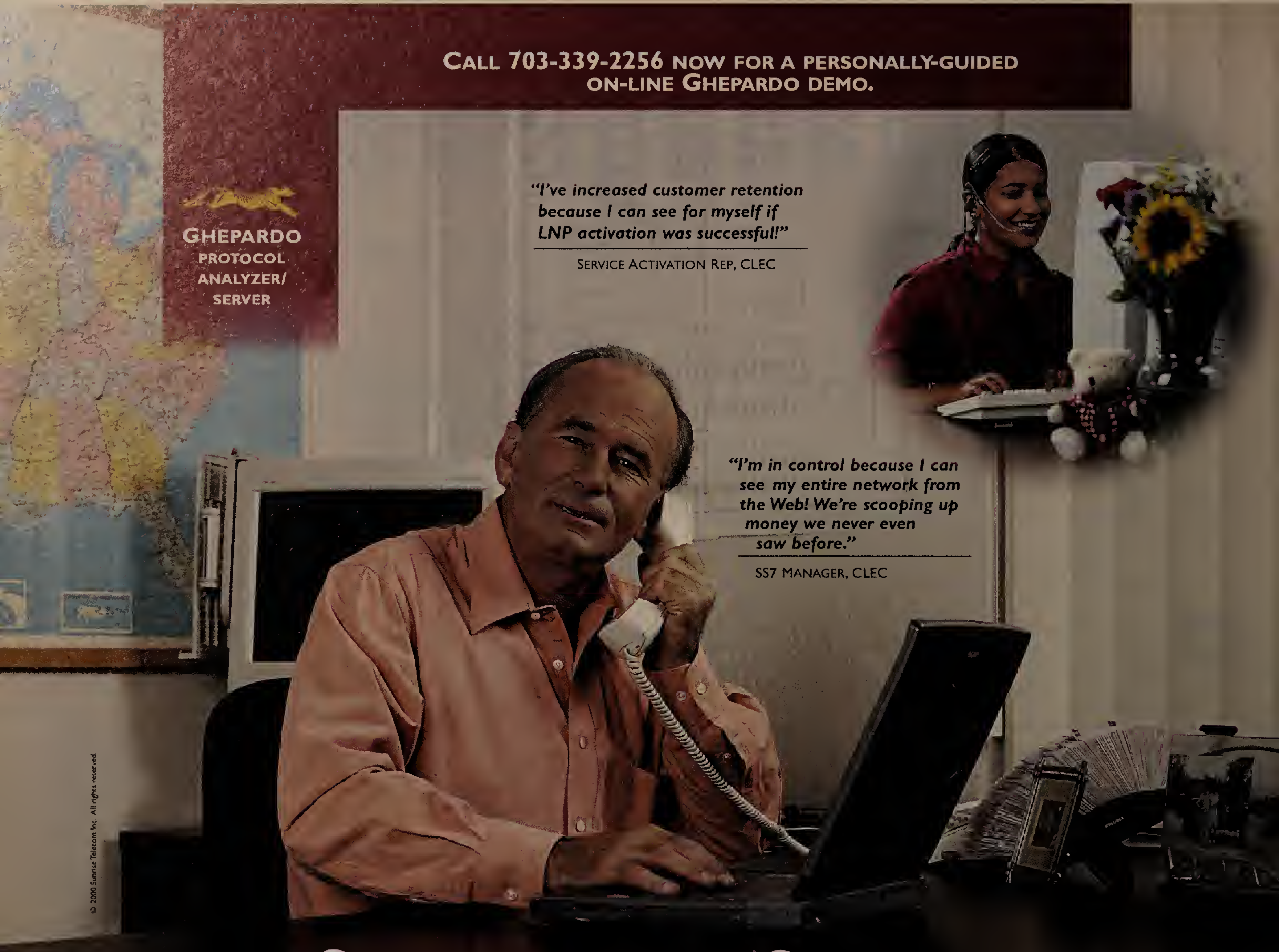

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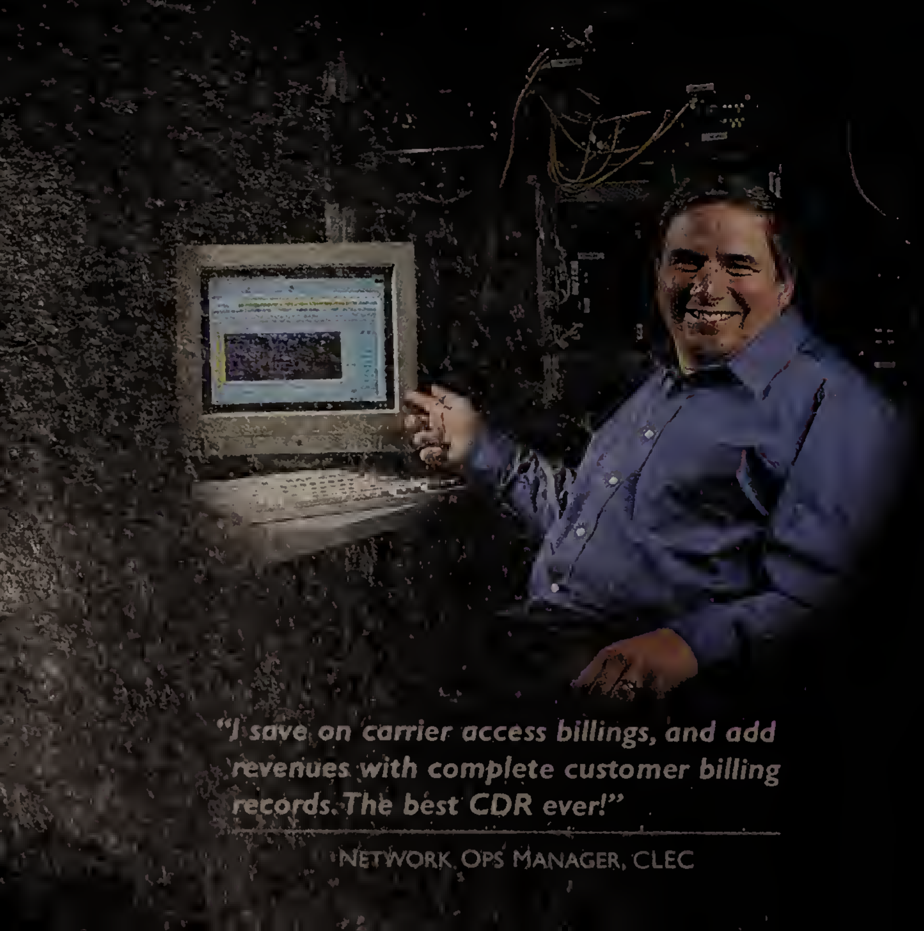

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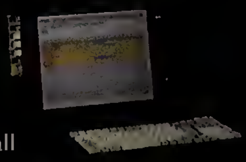

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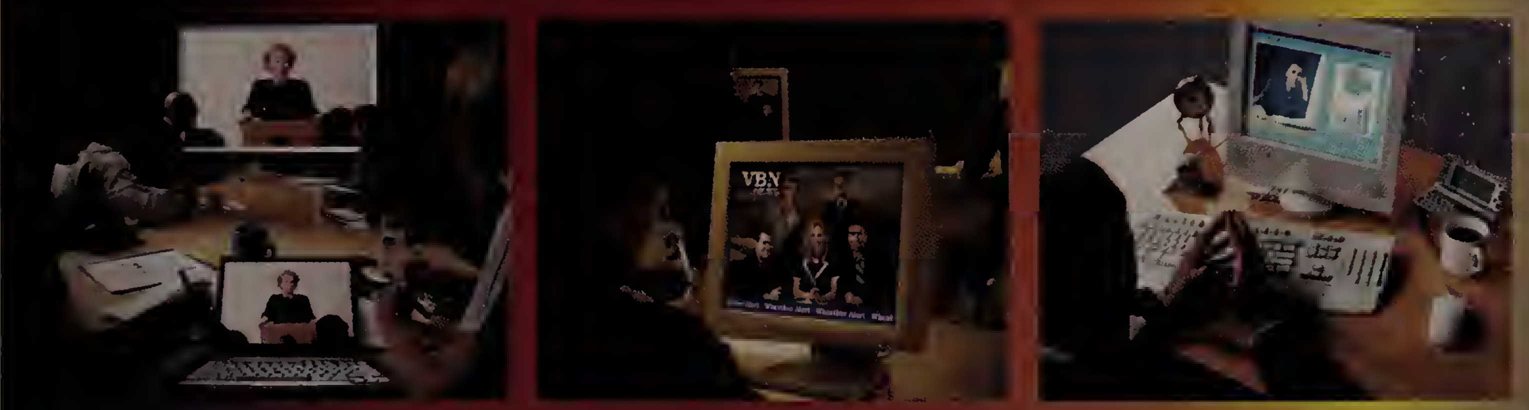

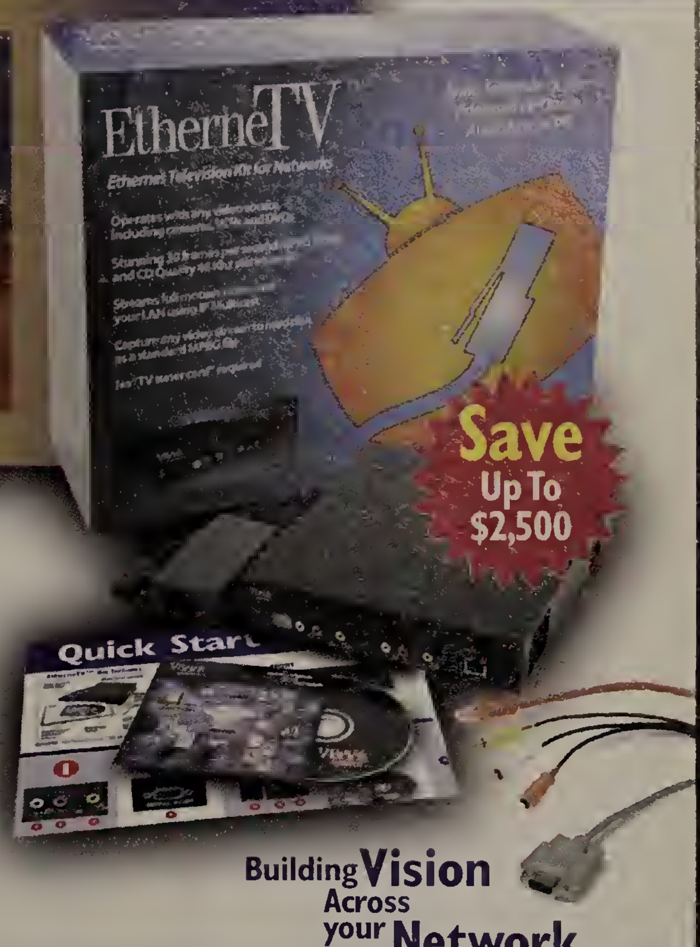

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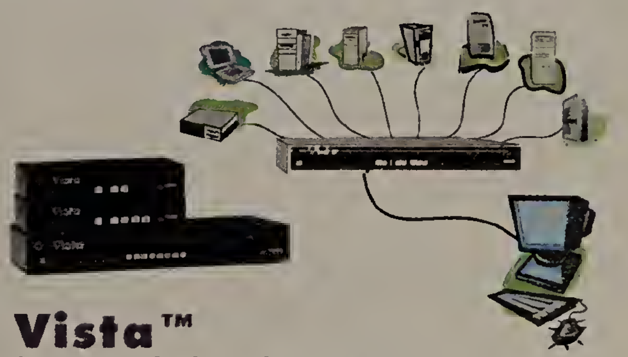

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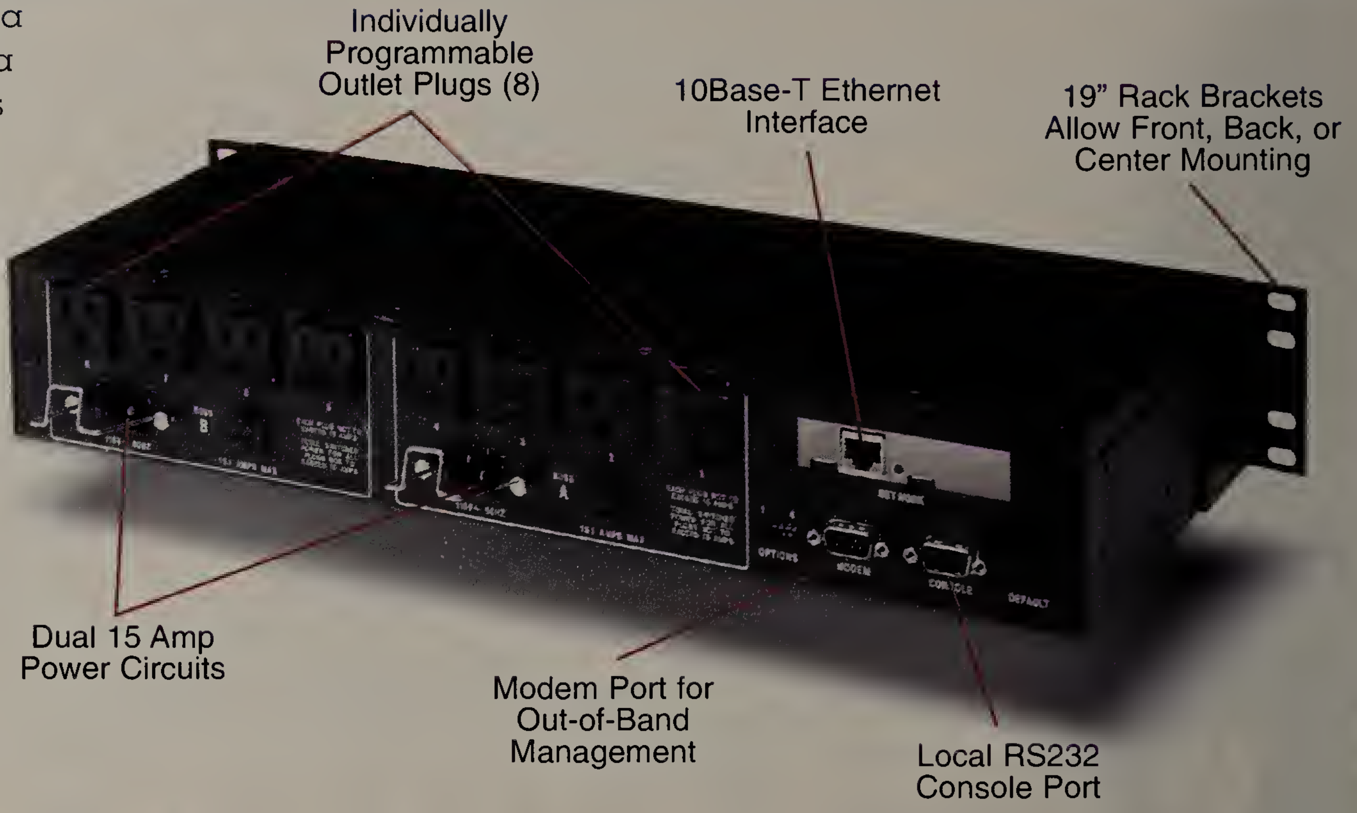
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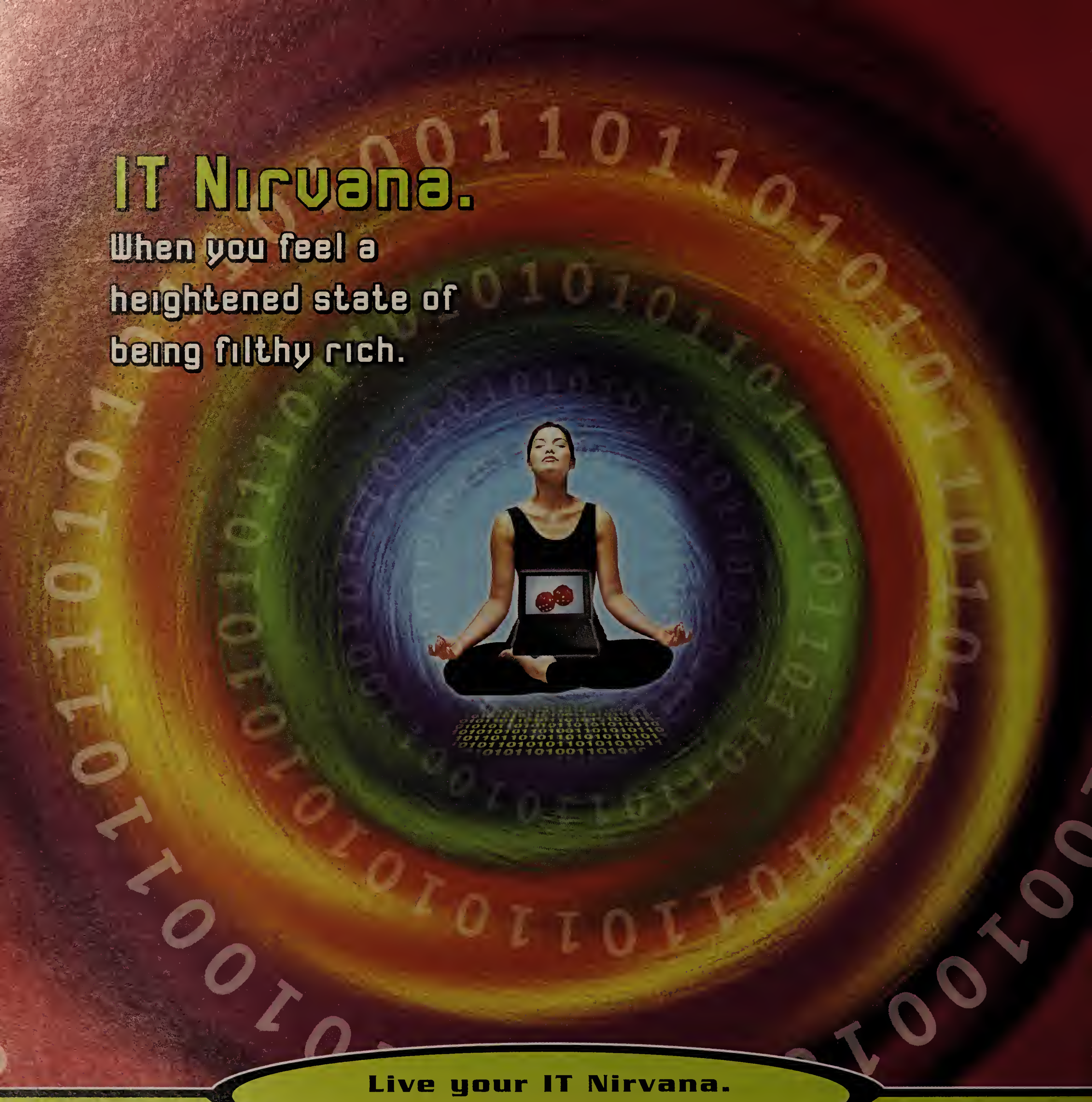
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ROSS SCHOOL

The Ross School, an innovative laboratory school in East Hampton, New York seeks candidates for the following positions:

Chief Technology Officer

The CTO will manage all technological and informational services and staff for the Ross Institute, coordinating the following areas: Information Services, Software Development and Instructional Technology. He/she is expected to exhibit a high degree of inter-personal and communication skills as well as provide services beyond technical knowledge such as research, business proposals, documentation, training, procurement procedures and project management. Through collaborative efforts, the CTO will globally broaden the educational endeavors of the Ross School via the concept of a "virtual school". This undertaking will require a thorough understanding through research of an online community, a sound business plan and the development of measurable objectives.

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Grounded in the principles of educational reform (particularly Cooperative Learning, Individual Learning Planning and the accommodation of Multiple Intelligences), the ideal candidate will have an advanced graduate degree in education (ED.D. preferred) and can demonstrate how those reform principles can be mobilized via the integration of technology in K-12 education. This person will manage the integration of technology across all domains in the classroom by supervising the team-level Technology Coordinators to ensure that adequate support, integration and faculty development are available to their academic team. Furthermore, he/she will research the added value technology contributes to learning.

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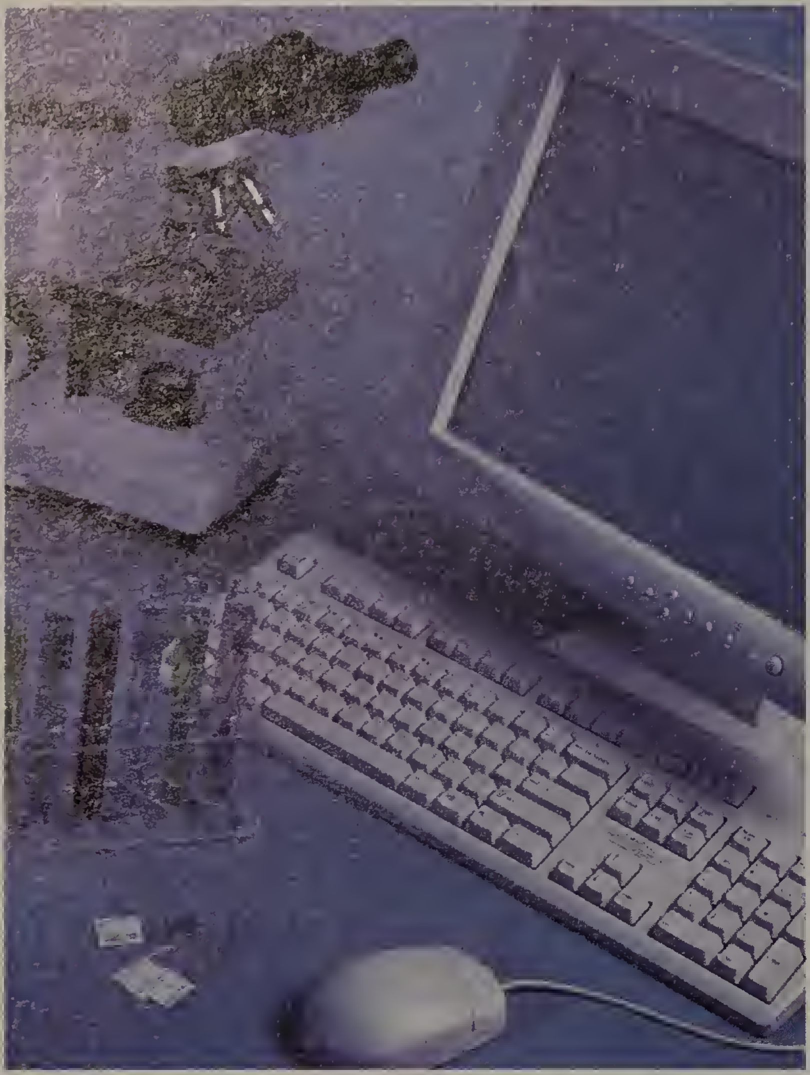

IT Careers in *Healthcare*

Imagine a world where patients can check into a healthcare facility and, without filling out myriad forms, be ushered in for care. The physician knows the patient history and can move you to a care plan more quickly than ever before. And, after the healthcare incident is complete, the overall healthcare experience is captured in a file that accurately reflects costs at every step along the way.

If this sounds like material for a futuristic novel, think again. This is the kind of healthcare experience institutions around the country are trying to create for patients, where accuracy, speed and better healthcare are the products of a trillion dollar market every year.

Digineer, Inc.
Cincinnati, OH

Among the firms that healthcare institutions look to for development and creation of new software solutions is Digineer, based in Cincinnati. Founded in 1986, the firm has completed custom software development for the industry, including state-of-the-art disease management software being used by the world's most prominent clinic for diabetes.

"We're now doing some slick wireless work and web-based tools to support physicians," says Lisa Kaminski, chief talent agent for the firm. "In both cases, the effort is designed to increase ease of use and convenience of data and tools for the physician."

Digineer historically hires individuals who have object-oriented and web-development skills. "We also need people who have team skills but who can work independently and directly with our clients," says Kaminski. "This is a fast-paced environment. The work itself is the biggest draw for our employees."

Kaminski says that because the solutions and products developed at Digineer tend to be groundbreakers, the experience is a learning one. "We create and provide turn-key products, but we also work with clients who have a need," she explains. "For instance, we might have a client that needs custom software that will support transplants. We help them figure out an approach and then develop it."

HCA
Nashville, TN

HCA uses information technology to support more than 200 hospitals spread across the Sun Belt. Chris Costello, vice president of solutions and services operations, says the 1,000-person IT organization is a centralized service for its hospitals, from revenue cycle management to clinical systems.

Currently, HCA is replacing a suite of financial packages with Lawson ERP and is creating a Java-based web browser to support revenue cycle management. Costello says IT professionals are also developing a supply management system, warehouse management system and an enterprise-wide data warehouse. "We're concentrating first on the back-office operations, to be followed by clinical data warehouse management," he explains. HCA's IT group developed a share patient records capability last year for each of its markets.

To reach these goals, Costello will hire Java programmers and architects for web-enablement projects, business analysts and IT professionals with database skills. "While we need people who have object-oriented development experience, we also want people who have a well-rounded life," he says. "We want people who do things other than work, who are accomplishment-driven and whose work experiences show a pattern of measurable success and growth."

Costello says Nashville is a growing IT community and is "the biggest healthcare town in the nation." "The healthcare industry in general is under pressure to better manage care for patients and to control and drive down costs," says Costello. "We are turning to technology as the means to create that improvement."

Mount Sinai NYU Health
New York, NY

Mount Sinai NYU Health applies information technology with the precision of a surgeon, creating and putting to use systems and packages that support five world-class hospitals and interweave with the systems that support the NYU and Mount Sinai Schools of Medicine.

Yee Lam, technical staffing specialist, says the healthcare giant earned the *U.S. News & World Report* "Consumer Choice Award" in its survey of best hospitals. "We have more than 450 IT professionals who provide service to all five sites. The technology directly impacts our patients, making what we provide more effective and efficient," she says.

Mount Sinai NYU Health recently rolled out its new five-year implementation plan for IT. "The plan puts patients at the center of all we do," says Lam. "The strategic information management plan, known as SIMP, will weave together separate strands of clinical and administrative data into an all-in-one system. This partnership-wide information system will be so comprehensive and easy to use that it will give caregivers instant access to all the information they need about a patient's condition – whenever and wherever they need it."

To support the healthcare giant, Lam is hiring individuals for various areas, including applications and architecture, network infrastructure and distributed systems. "Besides technical skills and experience, we need people who can fill a need today but who have the ability to grow for the future," she says. "We've found that when IT professionals get boxed in, their work becomes limited and they become dissatisfied.

"IT in our organization touches every department," Lam says. "There is constant growth in using technology to provide patient care. The caregivers on the front line can't do it alone. IT provides them with the speed, accuracy and the quality of care for which Mount Sinai NYU Health is world renowned."

Partners HealthCare
Charlestown, MA

Partners HealthCare is an integrated, not-for-profit health care delivery system offering patients a continuum of coordinated, high-quality care. Founding hospitals, recognized for their world-renowned patient care, teaching and research, include Brigham and Women's Hospital and Massachusetts General Hospital, both teaching affiliates of Harvard Medical School. Partners also includes primary care and specialty physicians, community health centers and other health-related entities.

Bill Ramon, staffing specialist, says Partners information systems group, with approximately 600 employees, is undertaking more than a dozen projects that are critical to the health system, from wireless systems to implementation of PeopleSoft's HRMS applications. Partners also uses sophisticated, home-grown applications. For example, the group developed order-entry systems to keep patient encounter notes and a system to coordinate medication delivery.

"To support the projects, we need system designers, analysts, people with visual-basic experience and web development programmers," Ramon says. "It's helpful for our analysts to have a clinical background and know our customer's view." Ramon expects to hire approximately 100 people in 2001.

"We are an expanding operation, and we do really cool projects," says Ramon. "We have a strong commitment to our employees' ongoing professional development with opportunities for company-paid training, a brown bag lunch series, and a tuition reimbursement program. There is no one career path, but there are opportunities to gain exposure to a variety of projects and to pursue a future with Partners in either a technical or a managerial career."

For more job opportunities with healthcare firms, turn to the pages of ITcareers.

- **If you'd like to take part in an upcoming ITcareers feature, contact Janis Crowley, 650.312.0607 or janis_crawley@itcareers.net.**
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LATIN AMERICA PROJECT MANAGER. Oversees & manages major project involving development & marketing of MerchandiZer software for Latin America. Assists Spanish & Portuguese speaking users in establishing, implementing and maintaining of specific systems for proper software application. Maintains project quality control. Recruits and supervises IT professionals involved in project. Plans work assignments, schedules and monitors work performance. Prepares project status report. Formalizes project activities and guides project acceptance as a production system. Job is in Miami, FL. 40 hrs weekly, 9:00 am to 5:00 pm. $61,000 annually. Bachelor's degree or equivalent in business administration or related field and two years experience in job offered required. Fax resume to SMX Services & Consulting, Attention Mercedes Lamela (305)463-7991.

INFORMATION SYSTEM DEVELOPER to design, develop and analyze software for internet and e-commerce solutions and billing applications using principles of software engineering and computer networking; perform data modeling and normalization, object oriented analysis and software design using Visual Basic, Visual C++, ASP, C/C++, VBScript, JavaScript, HTML, SOL Server, IIS, Visual Interdev and Windows NT; develop COM objects for billing systems and web site using Visual Basic. Require: M.S. in Computer Science/Computer Information Systems. Coursework must include object oriented programming, network design and management and system integration. Salary: $65,000 per year, 8 am to 5 pm, M-F. Apply with resume to: HR Manager, UtiliMan Systems, Inc., 6290 McDonough Dr., Suite I, Norcross, GA 30093.

Software Engineer

Design, Development and Implementation of commercial / business application systems. Design system testing procedure and user documentation. Must have experience in Visual Basic, SOL Server, RDBMS (Oracle) and Windows 95/NT. Require 1 yr exp. in job offered or 1 yr exp. in Software Development. MS in Computer Science, Engg, Math or related field. Work requires traveling to various locations throughout the US. Salary is $75,000/yr, 40 hrs/wk, 8:00 to 5:00 p.m. Send two copies of resume to Job Order # 20010279, Labor Exchange Office, 19 Staniford St, 1st floor, Boston, MA 02114.

Software Engineer. 8a-5p. 40 hrs/wk. Dsgn, dvlp, test & implmt s/ware applics w/hardware interface using C, C++, COBOL, IMS, Perl, Oracle, UNIX and Win. Masters or equiv deg in Comp Sci, Electronics or related branch of Engg. In lieu of Masters, candidate can have Bach in specified majors & 5 yrs exp as Systms Admin/Prgmr Analyst. Resume w/r/#001 to: CSS, Inc. 7094 Peachtree Indus Blvd., Ste 201, Norcross, GA 30071.

Vice President, Software Development - Manage multiple software construction projects in multiple countries. Transition the development organization from a legacy development culture to a web development culture. Build an effective and efficient development methodology leveraging the strengths of each group and focusing on shortening the development cycle, bringing products to market faster. Together with the executive team, develop and monitor rolling budgets, departmental visions, goals and objectives with metrics. Serve as a spokesperson for the company. Supervise over 100 employees. 30% international travel required. Requirements include a Bachelor's degree or equivalent in Computer Science, an Engineering discipline or related field and eight years of progressively responsible experience in the job offered or related fields of technology and software development. Applicants must have unrestricted authorization to work in the United States. Salary $125,000/year. 40 hours/wk. Respond with two copies of resume to Case #20010498, Labor Exchange Office, 19 Staniford St., 1st Fl., Boston, MA 02114

PROGRAMMER ANALYST
Analyze, dsgn. & implement systems. Dvlp. apps. & technical & user-level documentation. Duties: (i) preparing schematics, data models & prototypes; (ii) determining appropriate new & adapted hardware & software; (iii) determining & dsgng. data base level changes for enhancements of new programs; (iv) creating GUI forms, queries, functions, menus & on-line reports; (v) dsgng., coding & testing individual programs, reports, queries & filters; & (vi) testing & debugging programs. B.S. in Comp. Sci., Engrg., Business, Physics or Math plus 2 yrs. exp. in position offered or as Software Engr., Systems Analyst, or Software Consultant rqd. Must have working knowledge of Oracle RDBMS; SOL*Plus, PL/SOL, Forms, Reports, & Pro*C tools; & SOL language. High mobility preferred. 40 hrs/wk, 8 a.m. – 5 p.m., $67,000/yr. Qualified applicants report/submit resume to: Sue Notarnicola, Supervisor, Fayette County Team PA CareerLink, 32 Iowa Street, Uniontown, PA 15401. Refer to Job Order No. WEB156081.

SYSTEMS ANALYST
(Multiple Openings)

Analyze & evaluate existing or proposed systems & revise computer programs, systems & related procedures to process data using in-depth knowledge of the software dvlpmt. life cycle. Encodes, tests, debugs & installs operating programs & other software systems. Dsgns. & codes interface programs client servers using BAAN ERP Manufacturing & BAAN ERP Distribution tools & programming languages. B.S. (or equivalent) in Comp. Sci., Math, Engrg., Business or Commerce plus 2 yrs. exp. in either job offered or as Programmer Analyst or Software Engr. rqd. Must be proficient in BAAN ERP configuration management; & PL/SOL or COBOL programming language. High mobility preferred. 40 hrs/wk, 8 am – 5 pm, $78,000/yr. Qualified applicants report/submit resume to: Thomas Dembosky, Mngr., Indiana Job Ctr., 350 N. Fourth St., Indiana, PA 15701-2000. Refer to Job Order No. WEB156280.

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COMPUTER SCIENCE: For fall 2001, tenure-track position at beginning Assistant Professor level to teach courses in information technology (including C++ and object-oriented programming), assist in developing/implementing new major in information technology. Qualifications: Ph.D. in Computer Science preferred; Masters in Computer Science with industry experience in information technology (client-server, N-tiered distributed systems) considered. Candidates should demonstrate strong interest in undergraduate teaching in liberal arts environment. To apply, send letter of application; names, addresses, telephone numbers of four references; transcripts (copies accepted) to: Human Resources, Massachusetts College of Liberal Arts, 375 Church Street, North Adams, MA 01247-4100. Applications will be accepted until position is filled. For more information visit www.mcla.edu. Women and minorities are encouraged to apply. MCLA is an AA/EEO employer.

Consultant (Quality Assurance Engineer). Job location: Burlington, MA. Duties: Perform module system & functional testing on application written in Visual Basic. Perform back-end validation. Test data bridges & conversion process from the legacy system to the Client.Server application. Design test cases & map functional specifications. Test web based applications & eCommerce web sites. Perform requirements gathering, analysis, specifications, implementation support & deployment for soft. development lifecycle. Perform functional testing of web sites. Requires: B.S. or foreign equiv. in Engineering, Comp. Sci./Info. Sci. or a closely related field plus 1 yr. exp. in the job offered or 1 yr. exp. as a Consultant. Exp. which may have been obtained concurrently, must include: 1 yr. of exp. using Visual Basic. Send resume to Carmen Strickland, marchFIRST, Inc., 311 S. Wacker Dr., Suite 3500, Chicago, IL 60606.

SOFTWARE ENGINEER to provide on-site consultancy to design, develop and implement software systems using C/C++, Java, PB, VB, Sybase, Oracle, SOL Server, NDM, COBOL, EDI, Dialogic SDK, Swift, JCL, DB-Library, TCP/IP programming, shell scripts on UNIX, Windows NT, Sun Solaris and Novell Netware platforms; design systems using UML, OOAD, ERD tools for mulyi-threaded applications. Require: Masters (or equivalent) in Computer Science/Mathematics and three years experience in the job offered or any experience providing skills in described duties. Bachelor's and five years experience may be substituted for Masters and three years experience. 40% travel required to customer sites within the United States. Salary: $64,000 per year, 8 am to 5pm, M-F, Apply with resume to: President, Business Oriented Software Solutions, Inc., 3040 Holcomb Bridge Road, Suite D-2, Norcross, GA 30071.

SQL Server DBA: create, maintain and tune databases; write SOL transact object. Req. BS or equiv. In CIS, CS or MIS with proficiency in C++, NT & performance tuning, $65K/yr.
Systems Analyst: using C, C++ & Java to perform software integration & testing, works on multiple platforms including Unix, OS/2 & Windows NT. Req. BS or equiv. in CIS, CS, MIS, EE or related field w. proficiency in C++, Java & Unix, $53K/yr.
Software Engineer: develops web applications using Java, JavaScript, Oracle, DHTML, XML, ASP, Visual Interdev & PeopleSoft on Unix & Windows NT. Req. BS or equiv. in CS, CIS, MIS, math, engineering or related field w. proficiency in Java, C++, or oracle, $50K - 60K/yr.
Network Engineer: setup CISCO & other major networking routers. Develop methods to increase performance of the systems & to reduce network traffic. Req. BS or equiv. in CS, CIS, MIS, CE, EE or related field w proficiency in Unix, CISCO, & NT. $55K/yr.
All these four positions require 8-5, 40hr/wk, contact Data All Technologies, Inc. 3000 Old Alabama Rd. Ste 119 #105, Alpgaretta, GA 30022, fax: 770-674-4530

SYSTEMS ANALYST
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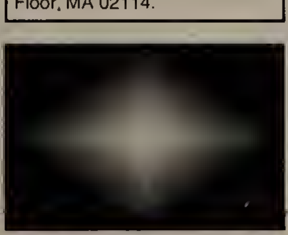
Vice President - Business Finance and Product Management (Charlotte, NC): Responsible for planning, developing, and directing financial policies and related software product development practices and strategies for provider of corporate Internet banking products. Responsible for multimillion dollar revenue plan, including product portfolio segmentation and profitability, revenue recognition, cash management, financial and business reporting and contract negotiations. Establishes the product direction for software releases and manages related partner provided components of the software developed. Responsible for the communication with clients on release contents and manages the input from these same clients. Must have Bachelor's Degree, or foreign degree equivalent, in Finance, Business or related field. Must have ten yrs experience in job offered or ten yrs executive management experience in financial services. Experience may have been obtained concurrently and must include: (i) 2 yrs experience in e–commerce payments and business banking; (ii) 2 yrs experience in cash management; and (iii) 2 yrs experience sales contract negotiations. Must have legal authority to work in the U.S. Send resume to: A. Dugan (REF:VP), S1 Corporation, 2815 Coliseum Centre Drive, Charlotte, NC 28217.

Systems Analyst * Resp for analyzing systems requirements in order to create & deploy mgmt info systems based on company's Groupware techniques. Duties include interacting w/ internal & external clients to understand their needs; designing, developing, & translating business needs into functional specs & designs; coding solutions using Groupware & Internet technologies; deploying apps; training endusers; & installing, optimizing, & managing networks using Groupware technologies & tools. Also use GUI, Visual Basic, Lotus Notes, Java, & Java Script to carry out duties. Knowledge of GUI, Visual Basic, Lotus Notes, Java, & Java Script req'd. Requires M.S. or equiv. in C.S., Electronics Engineering, or closely related field, plus 3 years exp. in S/W Development (B.S. in C.S., Electronics Engineering, or closely related field, in conjunction w/ at least 5 yrs of progressive exp in s/w development, may substitute for a M.S. degree plus 3 yrs of exp). 40 hrs/wk (9-5); $75,000/yr. Send 2 resumes to Case #20004538, Labor Exchange Office, 19 Staniford Street, 1st Floor, Boston, MA 02114.

Senior Software Engineer: Will design and implement various components of a distributed system including infrastructure, data structures, and algorithms. Essential skills employed include C++, Windows, COM/DCOM, as well as familiarity with Java, sockets, and Visual Basic. Must be able to work effectively with internal clients. Requirements: Master's Degree or (for) equiv in any engineering or IT related field and three (3) years experience in the job offered or in the related occupation of Software design or development OR Bachelor's degree in any Engineering or IT related field and five (5) years experience in the job offered or in the related occupation of Software design and development. Also, demonstrated expertise in developing software applications; using C++ and Windows; and using object-oriented design in a distributed environment. Offered salary is $73,000/year for full-time employment (min. 40 hours per week) and standard company benefits. EEO. Submit 2 resumes and respond to Case No 20004354, Labor Exchange Office, 19 Staniford Street, 1st Floor, MA 02114.



Sr. Software Engineer

To perform Database Administration functions such as installation/ upgrade of database software, configuration management, storage management, update tables/indexes, indexing, partitioning, analyze database failures and identify corrective solutions, archive/ backup & recovery strategies, application tuning, etc, in both OLTP and DSS (Data Warehouse) environment for INFORMIX and SOL server databases. Analyze, design, develop, implement, maintain and perform data modeling for both Operational (OLTP) and Data Warehouse (OLAP) applications. Experience in INFORMIX Online Database 7.x/8.x/5.x, MS/SOL Server 7.0/6.5, Oracle 6.x, in Microstrategy Suite of Business Intelligence, Informatica tools, in Unix Shell Scripting, Unix & Windows NT. Require 5 yrs exp. in job offered or 5 yrs exp. as Database Specialist. MS in Engineering, Computer Science, or related field. Work requires traveling to various locations throughout the US. Salary is $90,000/yr, 40 hrs/wk, 8:00 to 5:00 p.m. Send two copies of resume to Job Order # 20010426, Labor Exchange Office, 19 Staniford St, 1st floor, Boston, MA 02114.

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Plan, develop and manage systems in various technical environments. Manage team comprised of software engineers and systems analysts in software design, development, and implementation. Manage projects' budgets. Direct and coordinate activities of project personnel. Review projects proposals and plans to determine time frame and procedures for accomplishing projects. Confer with project staff and customers. Requires a Master's degree in Business Administration, Mgmt Information Systems, Computer Information Systems or Computer Science or equivalent as determined by a professional credentials evaluation, or completion of course requirements and one year experience in job offered or one year related experience in employee management, operations and budgeting. 40 hour work week. $59,935 per year. Send resume to: Dept. of Labor/ Bureau of Workforce Program Support/A.L.C. Unit, P.O. Box 10869, Tallahassee, Florida 32302-0869. Attn: EH. JOFL-2159958. Ad paid by an Equal Opportunity Employer.

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Software Engineer (multiple positions) wanted by Co involved in electronic distribution of financial research in New York, NY. Must have BS in Comp Sci, or Electrical/ Electronic Engg & 6 mths exp analyzing data processing reqmts to plan computer system to provide system capabilities required for projected work loads; planning layout & installation of new system modification of existing system; installing computer operating system s/ware; analyzing performance indicators to ensure that system is operating efficiently & troubleshooting various system components. Respond to: HR Dept, Multex.Com, Inc., 100 William St, 7th Fl, New York, NY 10038.

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Banking

MBNA Hallmark Information Services, a subsidiary of MBNA, the world's largest independent credit card lender, is accepting applications for several **Lead Database Engineering** positions.

Duties: Direct a project team by providing technical expertise and leadership. Ensure that related database projects comply with overall division strategies and goals while consistently prioritizing the workflow. Prepare, execute, and evaluate project plans, proposals, and timelines. Conduct long-range planning sessions to identify new database products to enhance the environment.

Requirements include but are not limited to: At least five (5) years of progressive experience in database development and maintenance and a four-year college degree or equivalent technical education. Experience with Unix and NT operating systems and database and/or applications development software. Minimum of four years experience with Sybase, Informix, Oracle, or a related relational database.

Please forward your resume and a cover letter, referencing code NA991078, to Ms. Sharon Alexander, MBNA Hallmark Information Services, 1100 North King Street, Wilmington, DE 19884-2234.

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Software Engineers

IRIS ASSOCIATES, the creator of Lotus Notes, Lotus Domino and Lotus Domino Designer, seeks to fill a number of Software Engineering positions at various levels of responsibility at our location in Westford, MA.

All positions require a BS degree (or equivalent and some require a Masters degree) in Computer Science, Mathematics or other relevant field, together with at least 4 to 7+ years' relevant experience.

- **Software Engineers (QuickPlace Internals)**
- **Software Engineers (Notes Client Editor)**
- **Software Engineers (Lotus-Iris Products Designer/ Server Administration)**
- **Software Project Managers (Domino Web Engine)**
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- **Principal, Senior and Entry Level**

Competitive benefits and starting salaries from $57,250 - $102,600, commensurate with the position's specific responsibilities, accompany this exciting high-tech environment growth opportunity.

Please mail or fax your resume, indicating Reference Code AIMSP@, to Iris Associates, Attn: Kendra Perry, Human Resources, Five Technology Park Drive, Westford, MA 01886; Fax: 978/692-5001. Email: Kendra_Perry@iris.com. Visit: www.iris.com.

iris ASSOCIATES

Iris Associates, a subsidiary of Lotus/ IBM, is an Equal Opportunity Employer

Programmer Aide wanted by NY based company for job loc in Jersey City, NJ.. Must have 2 years People-Soft exp. Respond to: HR Dept, FM Idel-Ural, Inc., Mara L. Reimer – 45 Tudor Road, Farmingdale, N.Y. 11735.

PSO Consultant: Support & maintain AMTrix software for current & prospective clients at all project levels, designing database functions & operations for Oracle, Sybase, Informix, & SOL. Req. BS in comp sci, engineering, or related tech field & 2 yrs exp as a programmer/ analyst/developer. $52K & up. Resumes to: D Hull, Viewlocity, Inc, 3475 Piedmont Rd, Ste 1700, Atlanta, GA 30305

Systems Engineer: Analysis, design and development of computer software including development of Internet/Intranet applications using object oriented methodologies C/C++, Visual C++ and JAVA in Windows and UNIX environments. MS in Comp Sci, Comp Engg, or Elec Engg. Respond to: HR Dept, DVC Group, Inc., 44 Whippany Rd., Morristown, NJ 07960.

SAP HUMAN RESOURCES APPLICATIONS CONSULTANT, 8am-5pm, Research, develop and design computer software systems as they relate to HR management functions such as payroll, benefits and time management. Required: proficiency with SAP HR and SAP ABAP/4, ASAP Cert., B.S. in IT or related field, or equiv. Send Resume: Careers@INC-Group.com

Software Engineer wanted by Arclever Technologies, Inc in Edison, NJ. Candidates must have Masters in comp sci or related fields w/at least 2 yrs exp in dsgng & dvlpg applic s/ware using OO & web technologies, HTML, Java, JSP, JDBC, Perl/ CGI.pm, ASP, Oracle, (PL/SOL), Unix. Exp w/hierarchical d/base such as Mumps a+. Solid quantitative & analytical skills reqd. Please send resume to HR Dept, Arclever Technologies, 21 Pointer Place, Kendall Park, NJ 08824. Fax: 877-857-1519.

CONSULTANT (Morristown, NJ) Development and design of PC and Mainframe custom applications, system conversions, and customization of existing applications. Req. B.S. Comp Sci + 2 yrs or M.S. degree Comp. Sci or Eng. 35 hrs/wk M-F. Send resume to ACG, Inc, 121 Headquarters Plaza, North Tower, 9th Floor, Morristown, NJ 07960. 973/898-0012.

SOFTWARE ENGINEERS/Sr. CONSULTANTS. Several positions available for qualified candidates possessing MS/BS or equivalent and relevant work experience with some of the following skills: Java, VisualAge for Java, EJB, Servlets, Oracle/SQL server DBA, Web Logic, BEA Tuxedo, Asymetrix Toolbook, ASP, Visual Basic, ActiveX Classes.

Send resumes to: ADA Group, Inc., PO Box 561 Springfield, IL 62705 Attn.: D. Arogundade, Legal right to work in the U.S must be stated.. EOE.

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eRunway, Inc. located in Westborough, MA seeks to fill the following positions:

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Deployment Engineer
(entry and senior levels)

Please forward your resume to: Mary Ann Jordan, Director of Human Resources, eRunway, Inc. 2000 West Park Drive, Westborough, MA 01581 or via fax to (508) 366-9901. EOE

IT TRAINER. Must have two years networking experience in NT and OS2. Requirement BSCS with CCNA certification. Able to work evening and weekends. Able to train CCNA class and other IT class. Must be responsible for developing and maintaining course curriculum. The ideal candidate should have had experience implementing, configuring, and supporting and administration of Cisco routers and switches. Must experience with CISCO router configuration on 2505, 2507, 2524, Cisco Catalyst 1900. Must be able to configure IP, IPX, IGRP, BGP, and EIGRP. Extensive knowledge of C programming. Knowledge of Visual Basic, Visual C++, SOL. Must be motivated to work with group. $55,000/yr.

Apply by resume to Abdur Malik, C.E.O., Malix I Technology, Inc 6050 McDonough Drive, Suite O, Norcross, GA 30093.

Senior Software Developer

Infodata Systems seeks a Sr. Software Dev. w/ 5+ years exp. Position requires min. 3 yrs Java related technologies & exp. w/Websphere Application Server (advanced Ed.), JRUN, ATG Dynamo,JBuilder, IBM Visual for Java, IDE, Java 2 Servelets 2.1, JSPs, EJB & J2EE standards. Exp. must also include EDI & UML Tools, i.e. Rational or GD Pro for design & analysis purposes. Applicants must be knowledgeable in the Object Oriented Develop. process. Must have Websphere application server deployment experience. Infodata has casual environment & offers exc. benefits. Forward resume to Eva Franklin, Infodata Systems Inc., 12150 Monument Dr., Fairfax, VA 22033

Full-time Software Engineer responsible for analyzing user requirements, procedures and problems to automate processing or to improve existing computer systems using C/C++, CGI, UNIX, object-oriented programming, Database programming, Web Server, Java, SOL, MySOL and Analytical Skills. Set up and configuration of web site server. Must have a Bachelor's Degree in CS, related field, or a foreign degree equivalent. Must have 1 yr of experience in job offered or a position with the same duties. Salary: $65,000/yr. Send resume to: Rachael Henderson, Well-Found Technology, Inc., 1395 S. Marietta Pkwy., Bldg. 400, Ste. 208, Marietta, GA 30067.

Consultant/Systems Analyst. Job location: Miami, FL. Job Duties: Perform E-commerce web development using Microsoft Site Server Commerce Technology. Develop soft. using SOL & Visual Basic. Develop business models. Create tables & generate SOL codes. Maintain database mgmt. and development using Oracle. Implement Customer Relationship Mgmt. soft. Perform system analysis & design. Develop & maintain Intranet and Extranet sites. Requires: B.B.A. in Bus. Admin., Finance, Comp. Sci./Info. Sci., Marketing or related field plus 3 yrs exp. in the job offered or 3 yrs exp. as a Technical Manager. Exp., which may have been obtained concurrently, must include: 1 yr. exp. using Visual Basic, SOL & Oracle. Send resume to Carmen Strickland, marchFIRST, Inc., 311 S. Wacker Dr., Suite 3500, 60606.

SENIOR SYSTEMS ENGINEER-wanted by Software Development Company. Requirements include a Bachelor's Degree in Computer Science or related field or equivalent with 4 yrs of object oriented technology experience. Travel may be necessary. Please respond to: Robyn Federman, HR Representative, IONA Technologies, Inc., 200 West Street, Waltham, MA 02451.

SYSTEM ENGINEER: A world leader of multimedia digital recording solutions, applications & related professional services for biz interaction management is seeking a System Engineer who will provide technical support for PC-based telephony interface systems running on LAN/WAN environments. Qualified applicants will have BS degree in Computer Sci or related discipline & 4 yrs of related exp in the field of computer network w/a good knowledge of client/ server architecture as well as exp w/C++, VB, NT server/workstations & MS SQL. Send resume to: Vivian Walker, NICE Systems, Inc., 200 Plaza Dr., 4th Fl., Secaucus, NJ 07094.

Software Engineer. Analyze, research, design, and develop computer systems for business applications in conjunction with hardware using SOL Server, Oracle, Visual Basic. Implement applications. Req'd Masters in comp. applic or engin & 1 yr exp. Send resumes to Sumeru Health Care; Att: S Kutty, 13911 Lake Shore Blvd, Suite K, Hudson, FL 34667.

Senior Database Administrator: Duties will include:maintaining multiple database configurations for development; designing and developing data model diagrams and schema diagrams using Visio or Erwin; creating production database and using utility program to monitor database performance; conducting performance tuning, application tuning, quality assurance checks, and trouble shooting; constructing data warehouse models using metadata constructs; making physical changes to databases including migration or data transformation for different databases; designing logical and physical databases using SOL, PL/SOL and T-SOL and reviewing description of changes to data base design; establishing physical database parameters at optimum values; and specifying user access level for each segment of one or more data items, such as insert, replace, retrieve, or delete data database. The Senior Database Administrator will supervise junior Database Engineers and manage the Database Administration division. He will also train junior Database Engineers and evaluate their performance for purposes of retention and promotion. Master's Degree or (for) equiv. in Computer Science, Electrical Engineering, Electronics Engineering OR Bachelor's Degree or (for) equiv. in Computer Science, Electrical Engineering, Electronics Engineering and five years progressive work experience in the job offered or five years in related occupation of database or systems administration. Also requires experience with two of the following RDBMS: Oracle, MS SOL Server, Sybase, or DB2. Must show demonstrated expertise in Pervasive SOL and Btrieve databases and in database (applications) tuning.

Offered salary is $72,500/year for full-time employment (min. 40 hours per week) and standard company benefits. EEO. Submit 2 resumes and respond to Case No. 20010232, Labor Exchange Office, 19 Staniford Street, 1st Floor, Boston, MA 02114.

Data Communications Analyst wanted by Network Integration & communication Sales Co. in NY,NY. Must have Bach of Science Degree in Electronics + 3 yrs related experience. Respond to: HR Dept., South Asian Media Wise, Inc. 104 West 27th St., NY,NY 10001

Director, Project Mngmt for our office in Columbia, MD To lead team of Progr dealing w/fulllife-cycle syst & application development. MS in Comp Sci/Info Mngmt/ related & 1 yr IT supervisory exp. Res to Cyber Dialogue, Attn: V. Garman, 304 Hudson St, Fl. 4, NY, NY 10013

Computer Programmer-Analyst for Law firm in Manh. Duties: Plan, test, dev. & modify comp. prog. & update existing sys. using C, Visual Basic, SQL, PL/SOL, JavaScript; identify operating procedures; dev. prog. using structured analysis/design, enter prog. codes into computer sys., design comp. terminal & train users, oversee installation of hardware/software, assist to program users. Bachelors in Computer Science. & 2 yrs. exp. on job offered reqd. or related exp. as a comp. Consultant, 40 hrs/WK, 9am -5pm, M-F, Send resume in dupl. to: Chhetry & Associates, P.C., 363 7th Avenue, #1500, NY, NY 10001.

Web Developer: Bachelor's Degree in C.S. or foreign equiv. Requires 2 yrs professional exp. with expertise in Java, HTML, JavaScript, JSPs, Servlets, & SilverStream, WebLogic or WebSphere. Excellent communication skill req. & ability to work in high pressure consulting environment. Generous Bonuses. Assignments throughout the U.S. Send resume to: jaubrey@criticalresourcetech.com. Additional info. at www.criticalresourcetech.com.

Web Developer, Lead, wanted by Financial Investment Firm in Garden City, NY to analyze, dsgn, dvlp & implmt web-based applics. Reqd BS in comp related field w/5 yrs IT exp. Expertise in ASP, VB-Script, Java-Script, HTML/ DHTML, COGNOS, SOL Server & Sybase; IIS, Java, XML, Visio plus. Competitive salary + bonus. Email resume to gjain@optonline.net or fax (516) 683-6123.

Systems Administrator:
Coordinate physical changes to computer data bases; code, test, & implement physical data base using Microsoft tech. exp. such as SQL-Data Base Administrator, Windows NT/98, Connectivity/ Interoperability, Intranet, Extranet & Internet, Visual Basic Prog. Language, C++, DOS, E-Commerce; network management. Must have 6 yrs. of exp. in the position. Respond to HR Dept., Lightbulbs Limited, 872 E. Oakland Park Blvd., Ft. Laud., FL 33334.

An international consulting firm is seeking: Programmer Analyst. Software Engineers and Database Administrators. Exp with a variety of hardware and software packages. We offer a competitive salary, commensurate rate with exp., plus a comprehensive benefit package, including 401K, health, dental and education assistance/reimbursement. Send resume to: Primesoft, LLC, One Lawson Lane, Burlington, VT 05401. Tel: 802-658-7600 /Fax: 802-658-1090 Email: recruiting@primesoftgroup.com

Computer Network Manager-Norcross, Ga. Provide technical support to network including remote market locations. Resolve network problems. Configure, install, trouble-shoot and monitor Windows NT on Novell network netware and NT workstations and server. Provide support for Cisco routers, firewall applications, dedicated circuits ISDN (PRI) and (BRI), and frame relay. Upgrade software. Reqmts: B.S. Degree in computer science, math, or engineering plus 1 year of experience in the job offered. Competitive salary, 40 hr/wk, Mon-Fri., 9am-5pm. Send resume to: PG#1, Parity Teltech, 3295 River Exchange Dr., Ste. 360, Norcross, GA 30092.

Software Engineer, Design, develop, document, test & implement various software modules; research, develop, deliver enhance and internally developed software application & resolve problems using related technologies; design & implement E-Commerce web sites; create & manage data on network performance;create & manage file systems across WINDOWS & UNIX platforms; create & manage data on network performance;define & determine business & system requirements; manage system backups & distater recovery; use WINDOWS 95,98,2000, NT, UNIX, C, C++, Visual BAsic, HTML, JAVA,ASP & Microsoft Access. Must Have MS in electronics, comp.sci or rel. field, compet sal/bnfts, FAX resume to :(212)768-7935, Attn: Recruiter

Sr. Programmers: Analyze, program and test the web-linking display system w/ Delphi, VB, Java, MS-SOL, TCPIP (Transfer Control Process Int'l Protocol) & LAN for on-line networking. 40h/w, 8-5, 4 yr wk exp in any field w/ VB, LAN. Resume to Ralph Paonessa of Hitech Elect. Display, 13900 US 19 N, Clrwtr, FL 33764/Fax it to: 727-524-6655

Senior Database Design Analyst: Job Site: Durham, N.C. Supervise analysis, design, & development of database design and applications using Lotus Notes, Oracle, JavaScript & PL/SOL. Design applications for Web sites using HTML, Lotus Domino5.x. Send resume to: Artech Information Systems, 60B Columbia Road, Morristown, NJ 07960 Att: Ajay Poddar FAX: (973) 993-9383.

Programmer wanted by printing & graphic design company in New York, NY, to maintain the company's web printing system. 2 yrs Programmer exp. required. Apply to: Expedi Printing Inc., 415 West 13th Street, New York, NY 10014. Attn: Allen Chou, Manager.

IT careers.com

Network Engineers (multiple positions) wanted by Co involved in electronic distribution of financial research in New York, NY. Must have BS in Comp Sci, Info Sys or Electrical/Electronic Engg & 2 yrs exp analyzing data processing reqmts to plan, administer, monitor, maintain & troubleshoot Wide Area Network (WAN) & Local Area Network (LAN); plan dsgn & implmt new n/work infrastructure; test & document n/work configuration infrastructure. Respond to: HR Dept, Multex.Com, Inc., 100,William St, 7th Fl, New York, NY 10038.

Microcomputer Support Specialists wanted by computer sales & service company in College Point, NY (3 positions available). Must have 2 yrs exp. Apply to: Essential Computer Inc., 128- 19 22nd Avenue, College Point, NY 11356. Attn.: Ken Chan.

INSTRUCTOR, Software Testing Course. Computer school in Oueens needs F/T instructor to proovide training & classes in Software Testing course.Assoc. degree in Computer Science or equivalent needed.Must have good skills in Operating Systems (Unix,Windows,Nt);Database (ORACLE,SOL); Test Tools (SILK,WINRUNNER)&Testing Metods. 2 yrs exp.Respond to BASDI,71-26 Roosevelt Ave. Jackson Heights,NY11372

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Senior Software Engineer [multiple openings]: Working independently, design, develop and debug computer software systems, specifically new applications features and functions for RDBMS based products. Lead in identifying and developing enhancements to new features and products, and plan and implement their portability. Develop and direct software system testing procedures, perform code fixes and resolutions, and conduct beta releases. Design and develop technical resolutions and workarounds. Develop and enhance reports and forms related to the applications, and document solutions to technical problems. Lead in analyzing and resolving technical product and testing issues, perform code fixes and resolutions, and suggest process improvements.

Reqs.: Positions require a Master of Science in Computer Science, Electrical Engineering, Information Systems, or related field or foreign equivalent, and three years of software engineering experience, or the equivalent (will accept a Bachelor of Science in Computer Science, Electrical Engineering, Information Systems, or a related field or foreign equivalent, followed by five years of progressive software engineering experience). Experience must include:

1) C;
2) C++;
3) Windows NT;
4) UNIX;
5) GIS Tools; and
6) Developer 2000/Designer 2000.

Job site/interview: Colorado Springs, CO. $77,600/yr. 40 hrs./wk. Application by resume only. Send resume to job order number JL1117531, CO Dept. of Labor & Employment, Employment Programs, ATTN: Steve Wilkerson, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117. EOE. .

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Software Engineer sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. At a senior level, design & develop business software applications &/or software tools that incorporate client/server architecture & interface with a variety of relational database management systems & various platforms. Analyze requirements. Create interoperability designs & integration frameworks. Code, test,& de–bug the software applications. Use programming languages C/C++,CASE tools in the design & development process. Provide technical assistance to Programmer/Analysts. Requires master's in comp.sci.;1 yr. exp. in the design & development of business software applications that interface with relational database management systems using C/C++ & CASE tools.8am-5pm,M-F; $75,000/yr.(2 openings.)Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400,1515 Arapahoe, Denver, CO 80202,& refer to Job Order Number JL1117497.

Associate Test Engineer sought by an R&D center for storage peripherals-mfc. prototypes in Louisville, CO to work in Brooklyn Park, MN & other unanticipated job sites in the US. Under close supervision, design & develop hardware & software that electronically tests networking circuit boards. Interface with testers & test circuit boards for networks using programming language C, Mentor Graphics tool in a UNIX workstation environment,& Lab Windows Development package. Work is closely monitored. Design & develop test fixture hardware including an internal circuit–board, sophisticated microchip & associated wiring. Requires Bachelor's in eng., electrical eng. or comp. sci.; working knowledge of designing & developing test hardware & software as well as programming language C & Mentor Graphics tools (working knowledge may be gained in either an academic or employment situation).8am-5pm, M-F;$49,920/yr.(2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II,#400,1515 Arapahoe, Denver, CO 80202,& refer to Job Order Number JL 1117495.

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Technical Consultant sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. Provide technical assistance, support,& training to internal & external users regarding software applications that run in Windows NT, UNIX, or AS/400 environments,& which interface with Microsoft SQL, ORACLE, & IBM DB2/400 databases. Trouble shoot & resolve problems that arise, or act as liaison between users & the applications & tools development groups. Engage in project management as required. Requires Bachelor's or foreign equivalent in comp. sci. or related field (incl. information/informatics sci.);1 yr. exp. providing technical assistance, support, &training to internal & external users regarding software applications that run in Windows NT,UNIX, or AS/400 environments,& which interface with Microsoft SQL,ORACLE,& IBM DB2/400 databases. 8am-5pm, M-F; $84,000/yr.(2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II,#400,1515 Arapahoe, Denver, CO 80202,& refer to Job Order Number JL1117435.

IT careers

MBNA Hallmark Information Services, a subsidiary of MBNA, the worldís largest independent credit card lender, is accepting applications for **several Lead Software Engineering positions.**

Will provide technical and administrative leadership in implementation, use and development of production operation software tools. This includes working with multiple departments in the planning, designing and implementation of new functions/capabilities.

Requirements: 5+ years of progressive experience in maintenance/development of software applications. Four-year college degree in computer science or technical training equivalent required. Demonstrated capability with distributed, client/server system development and implementation needed. Experience with programming languages, relational database concepts and theory and relational database products, such as Sybase, Oracle and Informix required.

Please forward your resume and a cover letter, Attn: Ms. Amy Mitts/Lead Software Engineer, MBNA Hallmark Information Services, M-S 4411, 16001 Dallas Parkway, Addison, TX 75380-9051.

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Software Engineers and Other Information Technology Professionals

Employee-owned Science Applications International Corporation (SAIC), a Fortune 500 company, provides high-technology services and products to government and commercial customers. SAIC and its subsidiaries have estimated annual revenues of over $5.5 billion and more than 41,000 employees at offices in over 150 cities worldwide. Currently, we have multiple openings at various U.S. locations for SOFTWARE ENGINEERS AND OTHER INFORMATION TECHNOLOGY PROFESSIONALS.

SAIC offers a competitive salary and comprehensive benefits package. Qualified applicants please forward your resume and salary requirements to: SAIC, Human Resources, REF: PT, 1450 Poydras Street, Suite 670, New Orleans, LA 70112; Fax: (800) 650-3562. We are an Affirmative Action Employer who values cultural diversity in the workplace.

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Software Engineer sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. Design & develop software applications &/or software tools that incorporate client/server architecture &/or are web–enabled. The software applications interface with a variety of relational database management systems & are platform independent. Analyze requirements. Create designs & design documentation. Code, test, & de–bug the software applications. Engage in project management as required. Use C/C++ & JAVA in the design & development process. Requires Bachelor's or foreign equivalent in comp. sci. or related field(incl. elec. eng.& electronics eng.& electronics & communication eng.); working knowledge of C/C++,JAVA,& relational database management systems (working knowledge may be gained in employment setting or in an academic program). 8am-5pm,M-F;$66,100/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II,#400,1515 Arapahoe, Denver, CO 80202,& refer to Job Order Number JL1117420.

Software Engineer sought by company in Louisville, CO that provides network computing storage to work in Louisville & other unanticipated job sites in the US. Under close supervision, engage in moderately complex tasks with respect to providing technical support for our software products. Address & resolve technical problems that clients are encountering with software products. These software applications incorporate client/server architecture & run on a number of different platforms. Modify & enhance software applications as required, including designing & developing the enhancements & modifications. Use C, C++, JAVA, & HTML in modifying & enhancing the software applications. Work is closely monitored Interface with development department & the infrastructure team in order to resolve recurring problems & bugs. Requires Bachelor's in comp. sci. or related field(incl. comp. eng.);working knowledge of JAVA & HTML (working knowledge may be gained through employment experience or through academic program). 8am-5pm, M-F. $52,000/yr.Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II,#400,1515 Arapahoe, Denver, CO 80202,& refer to Job Order Number JL 1117438.

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Sr. Software Engineer sought by financial services company in Englewood, CO, to work in Paramus, NJ & other unanticipated job sites in the U.S. to, at a senior level, design & develop software applications which run on Tandem architecture. The Tandem applications access an Enscribe database & run on a Guardian operating system. Analyze requirements. Create designs & design documentation. Code, test,& debug the software applications. Provide user training & support. Use C programming language & SQL in the development process. Requires Master's or equivalent in Computer Science or related field(including Electronic Engineering).Specifically, it requires a Master's, or foreign degree equivalent, plus 3 yrs of progressive Tandem software development experience, or a Bachelor's, or foreign degree equivalent, plus 5 yrs of progressive Tandem software development experience.$70,000/yr;M-F;8am-5pm.Respond by resume to James Shimada, Colorado Dept of Labor & Employment, Tower II,#400,1515 Arapahoe St., Denver, CO 80202,& refer to Job Order No.JL1117530.

Computer

The University of Illinois prides itself in its atmosphere conducive to study, shared discovery and innovative approaches to teaching and learning. Currently, the Office of Business and Financial Services, Urbana-Champaign Campus, seeks a computer professional who enjoys challenges under tight deadline pressure.

SQL DATABASE ADMINISTRATOR

You'll oversee designs, operations, upgrades, monitoring, change management and process control of our entire database environment; this includes Internet-based, client/server and mainframe applications. Other duties: analyzing databases, resolving data integrity problems, preparing documentation and training materials, working with project teams to assess future infrastructure requirements and recommend proper action; and coding and maintaining interfaces to core databases.

Qualifications include:

A BA/BS degree in Computer Science, Management Information or similar field (or Microsoft SQL Server Certification) and 2 years' SQL Server Database Administration experience (or BA/BS and 3 years' full-time work on SQL 6.5/7.0). Working knowledge of SQL Server 7.0 database engines, data design, NT, Oracle PL/SQL, Java, Data Warehousing or Access-to-SQL conversion methods a definite plus.

UI offers a salary fully commensurate with qualifications and experience.

A resume, including names, addresses and phone numbers of three professional references, should be submitted by April 6, 2001 to:

Ms. Janier Koss
U of I Office of
Business & Financial Services
342 Henry Administration Bldg.
506 S. Wright Street
Urbana, IL 61801

Phone: (217) 333-2497
Fax: (217) 244-5821
E-mail: jkoss@uillinois.edu
Job Description also posted on:
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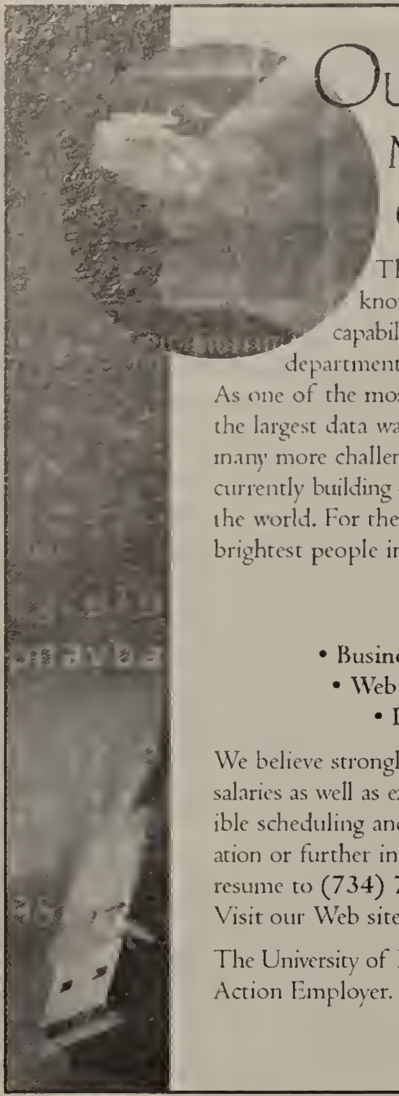

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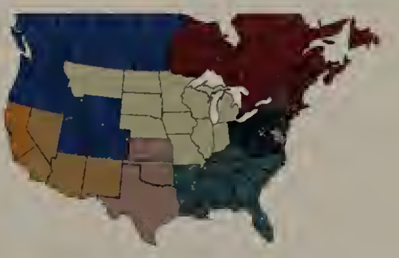

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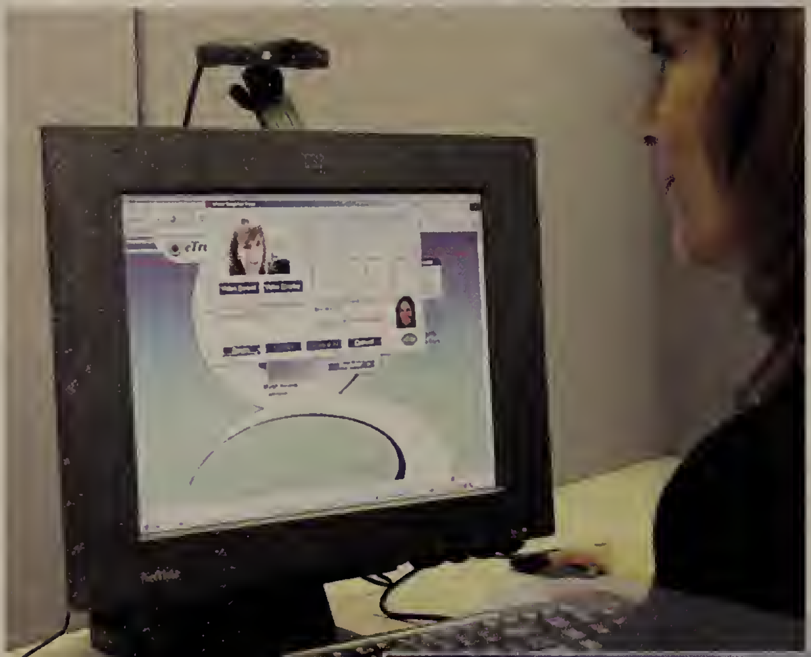

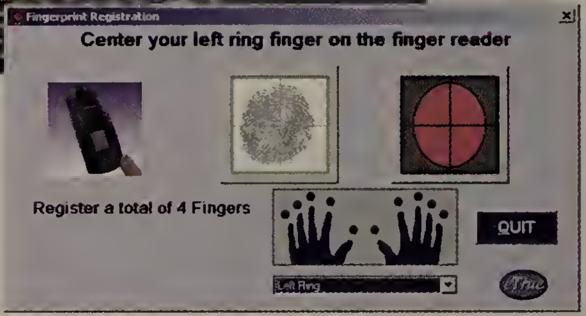

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ETrue's fingerprint recognition biometric authenticates a user's identity by matching a physical fingerprint scan with a stored digital hash of her finger print before granting network access.

products on the market are good enough for widespread — and possibly mandatory — use by Defense Department personnel to gain access to computer networks in the future. If the department puts its weight behind biometrics, it could push body-based authentication technology from the exotic to the mainstream.

Questions remain

But analysts following biometrics say that while products are improving, shortcomings remain. In general, the products are expensive and raise privacy fears. Biometrics offerings, particularly those for fingerprint scans, can also have high error rates, mistakenly rejecting someone based on his fingerprint.

Despite such worries, the U.S. military is taking a hard look at biometrics to determine if body-based authentication can replace passwords, says Phil Loranger, the U.S. Army's director of the Defense Department biometrics program.

Passwords can be stolen or sometimes cracked, but someone's fingerprint, voice-print and iris scan are unique, he notes.

"What attracted the Defense Department to this technology is that it can make our systems much more secure than passwords," Loranger says. Biometrics authentication also can work with public-key technology, even in place of the password typically needed to gain access to the keys, he adds.

During the next few months, the Biometrics Fusion Center will run tests on numerous biometrics products, with some preference for ones supporting the BioAPI standard developed by the Biometrics Consortium. That standard allows an application to support multiple types of biometrics authentication across vendor boundaries without having to write to separate APIs.

While there aren't plans to release the test findings, the Biometrics Fusion Center hopes to make recommendations to the Pentagon's upper echelons on the use of biometrics that could lead to large-scale purchases.Currently, biometrics finds limited use in the military, mainly in pilot programs at the U.S.Army Reserve centers and the Army Major Command for Emergency Operations Center.

According to research firm IDC, the biometrics market stands at about $300 million, with the government and private sector purchasing the technology about equally for use in building and computer access. IDC predicts biometrics will be a $1.8 billion market four years from now. Finger scan, voice authentication and signature verification are the three fastest-growing segments by sales.

Cyber-Sign and Communications Intelligence are the strongest players in signature verification. Identix, Sagem Morpho, the U.S. biometric subsidiary, Veridicom and Infineon are trying to grab hold of the finger-scan market. And the voice-print authentication niche is where T-Netix, ITT Nuance and Veritel try to be heard. But there are hundreds of other biometrics challengers as well.

Most biometrics products rely on storing a kind of digital hash of a fingerprint, iris scan or voice-print — not the actual image — in a database for later comparison. Microphones, fingerprint readers and other equipment is used by an individual wanting access to a computer network, and this captured personal imprint is compared against the template stored in the database.

Still some skeptics

Some analysts following the market for authentication technology based on body parts are skeptical that today's products are ready for prime time.

"Biometrics is a form of testing to try and figure out a match, and it can have false rejects or false acceptances," says Bill Campbell, a consultant at Eagle's Reach, the security firm he founded about a year ago after leaving Fidelity Investments, where he was director of information security engineering.

The biometrics vendors recognize this weakness, and they will quote the "equal error rate" for their devices based on their own tests, Campbell notes. It's impossible to compare one vendor's equal error rate against another's because there are no standardized tests.

But the larger question is whether any false rejections or acceptances are tolerable for use with important, and perhaps sensitive, applications. Error rates drop significantly with use of multimode biometrics where the user is required to submit voice and fingerprint, for example, to be processed at the same time, Campbell says.

But there is another problem. Campbell notes that biometrics can be spoofed by hackers.

While it's highly unlikely anyone could spoof a retinal scan, most forms of biometrics are vulnerable to replay attacks, he says.

These attacks could involve the interception of biometrics data, which would be stored and replayed later to get into a system or network. Exactly how this can be done depends on how the biometrics data gets transferred on the network, although the threat of replay attacks would be largely dispelled if biometrics devices employed encryption to further secure the data. That typically isn't done today, but it could be, thus raising the bar on the level of comfort provided by biometrics.

Biometrics is moving forward, Campbell says, pointing out that fingerprint and facial-scanning vendor eTrue recently became the first company to adopt a hosted application service provider model for biometrics, storing customers' personal data on the Internet. "When you buy their service, they give you the equipment for free," he adds.

NASA employees are said to be among the first customers for eTrue's hosted service for use in logging on to secure networks from home. ◪

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WorldCom,

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offer managed Web hosting support in its own data centers.

WorldCom is supporting its managed offering in its Ashburn, Va.; New York; Toronto and London data centers. By the end of the second quarter, facilities in Milan, Dublin, Paris and Frankfurt will be equipped to support managed Web hosting. Two more data centers in Singapore and Sydney are also expected to come online in the third quarter.

McMurtrie says WorldCom will continue to support Digex data centers in Beltsville, Md., San Jose and London, but that new customers will be supported within WorldCom facilities.

Analysts say the packaged services, coupled with WorldCom's global IP network, give the telecom company a leg up in the growing managed services market.

Other major telcos are also focusing on offering these services. Qwest Communications, for example, launched e-Solutions in January, giving customers access to bundled services that range from prepackaged Web site design and hosting to complex hosting and IT consulting. Those services range from $39 per month to $6,700 per month, says Rick Weston, senior vice president of Qwest Internet Solutions.

AT&T rolled out a fully managed Web hosting service bundle in August that lets users set up an e-commerce Web site in 30 minutes. AT&T also offers a range of higher-end bundled services that guarantee a 10-day installation period, says Sant Srinivasan, director, AT&T Web Hosting Services.

Cable & Wireless plans to launch a suite of standardized managed hosting services, probably next month, says a company spokesman.

The services will use NT, Win 2000, Solaris and Linux, and will range from basic to advanced.

Analysts say these companies are building on the hosting expertise they've developed during the past year and responding to customer demands by making it easier for businesses that don't need customization to get a successful e-commerce project launched quickly.

WorldCom executives say the point of packaged services is to reduce the cost and time typically associated with implementing a managed hosting arrangement by eliminating the need to custom-build each service.

In addition to the managed services, WorldCom will continue to offer collocation, shared hosting and custom hosting services, the company says.

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Novell,
continued from page 1

Partners, whose top executive Jack Messman has long served on Novell's board. He will succeed Schmidt as CEO.

Veteran Novell employees remember Messman — not always fondly — from his executive stint at Novell Data Systems and successor Novell in the early 1980s. Those who follow Novell closely are expressing skepticism about the $266 million acquisition, saying the union promises little synergy.

Also, sources say Schmidt wanted a graceful exit from day-to-day operations four years after being lured from Sun to transition Novell into the Internet age. Schmidt says it has been frustrating that he hasn't been able to communicate what he calls "the brilliance of [Novell's] Net Services strategy."

Analysts say the management change was necessary.

"Eric Schmidt is a visionary," says Steve Shepich, an equity analyst with H&R Block Financial Advisors. "He's definitely the guy you want to lead your strategic direction, but operationally he's dropped the ball and lost the opportunity to drive directory services when Microsoft was late with Windows 2000. Novell hasn't been able to sell its idea."

Until last year, things had been looking up for Novell and Schmidt. The company had launched its One Net Internet strategy, made a foray into e-commerce with its iChain product and reported 16 profitable quarters. Fortunes for Novell nose-dived in 2000 when the company reported three dismal financial quarters and an annual loss of $49.5 million. Schmidt attributed the drop to a downturn in sales of Novell's packaged products.

Customers say Novell could still be successful if it receives the consulting help it needs in selling and integrating the company's newer Internet and e-commerce focused products.

The company has introduced several products in the past year that support its One Net strategy: NDS eDirectory, which operates on NetWare, Windows NT/2000, Solaris, OS 390, Linux and Tru64 Unix, as well as iChain, Novell Portal Services, OnDemand Services and eGuide. In One Net, users can access the network from a multitude of devices, irrespective of company LAN, Internet, extranet or intranet boundaries

"Many of Novell's newer products require consulting expertise," says Ron Diebert, manager of network services for Baltimore County government in Maryland. "The average [Certified Novell Engineer] I have [requires consulting help] when you are talking about using DirXML, iChain or Novell Portal Services."

Messman, while a relative unknown to the financial and industry analyst community, is familiar to those who worked with him at Novell's predecessor, Novell Data Systems. From 1981 to 1983 Messman worked for Safeguard Scientific, the venture capital firm that funded Novell Data Systems.

"He was our hatchet man," recalls Reid Clarke, a Novell founder. "He came out to fire the first president and was sent by the board to find out why Novell Data Systems didn't make its projections the second year. Safeguard wanted to sell the company, and Messman had me looking around to sell it to anyone that would buy."

In his role with Novell Data Systems, Messman hired Ray Noorda as CEO. Noorda and Safeguard Scientific reorganized the company as Novell, Inc. Messman also hired a group of young computer scientists called SuperSet, which included Drew Major, Kyle Powell and Dale Neibaur, to write a program called ShareNet that let a computer share its disk with other computers.

Noorda and Safeguard Scientific refashioned Novell from a failing manufacturer of terminals, printers and PCs into a market leader for system software.

Analysts are concerned about Messman's ability to continue Novell's thrust into the Net Services marketplace.

"I'm not bullish on the acquisition," Shepich says. "It's not as if Cambridge is selling Novell technology. I don't know how they are going to get synergies going. I don't know that Cambridge is marketing effectively either."

Last year, Cambridge Technology posted a net loss of $62.5 million on sales of $586 million. The company, which derived 74% of its revenue from e-commerce products and services, is vendor agnostic.

Messman isn't concerned that Cambridge consultants have little familiarity with NetWare or Novell's products.

"We will help Novell define new e-solutions models," Messman says. "We will also be able to maintain Cambridge's objective and independent point of view to the software choices that solve customer problems

See **Novell**, page 92

Schmidt's time as Novell CEO

During his tenure, Eric Schmidt repositioned the company to emphasize network management and services.

1997

Eric Schmidt on being named CEO: ***"This is an opportunity of a lifetime."***

1998

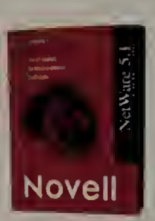
Ships ZENworks and NetWare 5.0. Schmidt: ***"NetWare 5 is . . . the latest proof of Novell's transformation in the Internet marketplace."***

Windows NT:
1.56 million copies sold
NetWare:
1.05 million copies sold

1999

Rolls out digitalme, Novell Internet Messaging and Internet Caching System.

Windows NT:
2 million copies sold
NetWare:
1.1 million copies sold



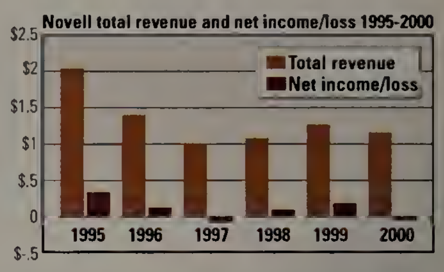
2000

Ships NetWare 5.1.

Novell offers OnDemand Services; iChain; ZENworks for Servers and eGuide.

Company reorganizes after financial shakeup; lays off 15% of employees. Schmidt comments: ***"We need to be better in addressing the multiple and often diverse markets . . . that we require for growth."***

Windows NT:
2.5 million copies sold
NetWare:
1 million copies sold


Novell total revenue and net income/loss 1995-2000

2001

Spins off caching and content-delivery services.

Schmidt steps down; names Jack Messman CEO.

Acquires Cambridge Technology Partners.

STAN BAROUH

NOVELL FAITHFUL TO HEAR PLANS

Seven thousand IT professionals will converge in Provo, Utah, this week for Novell's annual BrainShare user conference expecting to see new products and technologies that the company considers key to turning its fortunes around.

Although details were being guarded, company executives are expected to talk about a variety of products, including the Web-enabled OnDemand Services offering unveiled last week. OnDemand Services lets network managers in large companies or service providers offer products such as ZENworks for Servers or Microsoft Office over the Internet on a subscription basis.

Also on the agenda will be Novell's upcoming NetWare 6, a version of the operating system for servers with multiple processors, and GroupWise Bulletproof, which is integrated completely with NDS eDirectory and wireless devices. The company will also introduce Advanced Audit Services, Internet Print Protocol Services and the integration of Novell Cluster Services into NetWare 6. Novell will also offer numerous in-depth tutorials on using, installing and optimizing its Novell Portal Services, the Volera Excelerator (formerly the Internet Caching System) and ZENworks for Desktops and Servers.

Perhaps the products that elicit the most interest among users are OnDemand Services and Portal Services, the latter of which lets network managers develop customized interfaces for users.

OnDemand Services Version 1.5 incorporates technology acquired last week from Novetrix, which lets users access applications from a Web browser rather than the NetWare client.

OnDemand Services lets system integrator Joe Popper, owner of the Computer Gallery in Palm Springs, Calif., supply customers with applications more easily than with Citrix MetaFrame, he says.

"With OnDemand, you don't need to have a client piece of software installed like you do with Microsoft or Citrix," Popper says. "We have a customer that has offices in Palm Springs, Phoenix, Long Beach and Riverside, California. With OnDemand, we don't need to travel to each of these locations to install a client."

OnDemand Services is priced at either $80 per user for an unlimited use license or $4 per user per month.

Novell will also roll out its Advanced Audit Services (NAAS), which complement the IPX-based Auditcon utility and handle the auditing of users and groups in an IP-only network.

Novell is also likely to tell users that Novell Cluster Services will be included as a standard feature in the symmetric multiprocessing version of NetWare 6. The company will also show off the diagnostic capabilities of NetWare Remote Manager, such as thread profiling and memory usage categorization. Another new product, Novell's IPP Print Services, lets users install, configure and enhance local or remote network printing with a browser-based interface.

— Deni Connor

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Spared,

continued from page 1

Consider Lucent. The troubled telecommunications equipment vendor plans to slash 10,000 jobs in light of a 75% drop in its stock price during the past nine months. Yet company spokesman John Skalko says there will be “minimal, if any, effect on the IT department.”

“We will continue to work on streamlining our processes and increasing our Web-based transactions, which will be money well spent,” Skalko says. “This idea of increasing our Web-based transactions involves our customers, our suppliers and our employees. . . . We are working on overall supply-chain management.”

Lucent is not alone. Companies in fields such as technology, healthcare and transportation remain committed to putting their business processes online to improv efficiency. That means continuing to make investments to Web-enable legacy applications, migrate network infrastructures to ’Net protocols, and roll out new mission-critical applications.

“We want to focus on two things: productivity [enhancements for] revenue-supporting activities and Internet-related activities,” says Mark Tonnesen, vice president of information technology at Cisco. “We’ll be coming out of this [economic downturn] at some point, and we need to be better positioned in terms of how we leverage IT and how we utilize the Internet.”

Cisco is forging ahead with two multimillion-dollar Internet projects this spring. The new eSales application will provide an information and communications portal for sales staff. Cisco also will upgrade its Web-based order processing system for distributors and resellers in the fall.

However, Cisco is delaying a migration to a commercial expense reporting system, a PeopleSoft installation and a resume-tracking system.

“These projects are not strategic; they’re support-oriented,” Tonnesen says. “They can wait another six to nine months.”

Cisco hasn’t said how many of the 2,000 employees and 800 contractors in its IT shop will face layoffs. The network equipment manufacturer recently announced plans to cut as many as 5,000 employees and 3,000 contract workers.

Tips for surviving the slowdown

1. Align yourself with a strategic project tied to the core values of your company. Be sure you’re on a need-to-have project, not a nice-to-have project.
2. Keep technical skills current. If your company won’t invest in training for the latest hardware and software platforms, consider paying for it yourself.
3. Sharpen your soft skills. How well you manage people and projects is more important than technical skills or tenure when layoffs start.
4. Steer clear of legacy systems projects, particularly conversion efforts. You may be the only person who understands the old technology, but you’ll likely be gone once it’s replaced.
5. Focus on next-generation efforts, not cutting-edge efforts. Experimental projects often get axed when IT budgets get squeezed.

SOURCE: DRAKE BEAM MORIN

Belt-tightening takes hold

The economic uncertainty exemplified by last week’s plummeting stock prices is causing hesitancy among corporate CIOs and CTOs. IT consultants, for example, are feeling the pinch as corporate clients delay hiring them for new projects. And executive recruiters report slower hiring decisions for key network posts.

“There may be some pullback on capital spending. There could be layoffs in certain areas and some changes in leadership,” says Diane Tunick-Morello, vice president and research director at Gartner Group. “But I still think there’s very high demand out there for corporate IT services that doesn’t tend to get affected by a downturn.”

Tunick-Morello predicts that companies will continue to invest in customer-focused IT projects such as data mining and customer relationship management. But intranet and e-marketplace initiatives may not fare as well.

“The business requirements for new IT projects are being scrutinized,” she says. “They either need to cut costs or raise revenue.”

Miamonides Medical Center in Brooklyn, N.Y., is forging ahead with three major IT initiatives — all designed to improve the quality and efficiency of its record-keeping and medical care. Miamonides will launch software and servers for its emergency department, perinatal care records and ambulatory care records in July. Together these projects will cost several million dollars.

“We’re continuing with our IT investments as planned,” says Walter Fahey, CTO at Miamonides. “The hospital is actually making money, [unlike] many other hospitals. So we’ve been able to afford to allocate funds to IT projects and to look at how we can leapfrog over the current technology.”

In addition to using the three new software applications internally, Miamonides plans to spin off a for-profit company that will operate these applications as outsourced services for smaller hospitals. Fahey will serve as COO for the new company, dubbed Technology4Healthcare, when it launches this summer.

Technology4Healthcare will take over support for Miamonides’ 1,800 PCs as well as operate a fiber-optic backbone network that supports 22 hospital buildings in New York and New Jersey. Fahey says the hospital has spent $4.5 million on its network infrastructure over the past three years and will continue to invest where needed.

“The only affect of the [economic] downturn is that it’s made more people available that I could afford,” says Fahey, who recently added nine people to his staff, which now consists of 65 people. “We’ve been able to hire folks from other industries . . . and people have been a little more [willing to negotiate].”

Another firm that will continue making hefty investments in its Internet-related activities is Sabre, a leading provider of technology services for the airline industry. Sabre operates the popular Travelocity Web site for consumers and GetThere.com for business travelers.

Sabre plans to spend $100 million this year to develop Internet-enabled versions of the company’s suite of 17 software applications that handle crew scheduling, fare management, flight plans and other critical airline operations.

“Clearly, the Internet is influencing how travel is sold and marketed,” says Steve Clampett, senior vice president of software solutions at Sabre. “As the model evolves, we need to be out there in front.”

Clampett says Sabre’s technology investments will not be affected by the slowdown in business travel. “We think the Internet is going to be the delivery mechanism for our services, and I don’t see us backing off on that,” he says.

Sabre is, however, planning to enjoy “significant savings” in its IT operations budget this year with its decision to outsource the operation and maintenance of its desktops, mainframes, networks and administrative applications.

Overall, industry observers are cautiously optimistic about the fate of network professionals during the first major economic slowdown in a decade.

“The market is going to get a little softer, but I’m not sure we’re going to see wholesale layoffs of IT people,” says Duncan Mathison, a consultant with outplacement services provider Drake Beam Morin. “Every department is going to look for what they can cut. Those pressures are going to be on IT departments as much as on anybody else.”

Mathison recommends network professionals get involved with strategic development efforts tied to the company’s core line of business.

Those who end up looking for new positions should brace for lengthy job hunts. Recruiting for IT executives “has definitely slowed across the board,” says Russ Gray, manager director for Christian & Timbers, the largest IT executive recruiter in the U.S. Gray says he’s seen a 30% drop in the number of network executive searches he saw last year. At the same time, he sees “more people with higher skill sets on the market.” ◪

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Novell,

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in the best possible way.”

Novell hopes to grab 30% of its revenue from consulting services this year. In 2000, consulting was only 5%.

Observers are speculating that Messman may reprise his role from the Novell Data Systems days.

“It’s possible that the board is looking to Messman to do the same thing he did before,” says Rocco Esposito, CTO for window-covering manufacturer Hunter Douglas in Upper Saddle River, N.J. “You may see a reconstituted Cambridge Technology spun out of it with Novell’s consultants. Novell will be broken up over the next four to five years into some sort of unrecognizable form.

“When I look at Novell, I think of some of the companies in the ’80s like Wang that went into consulting,” Esposito says. “Novell is] throwing in the towel at this point.” ◪

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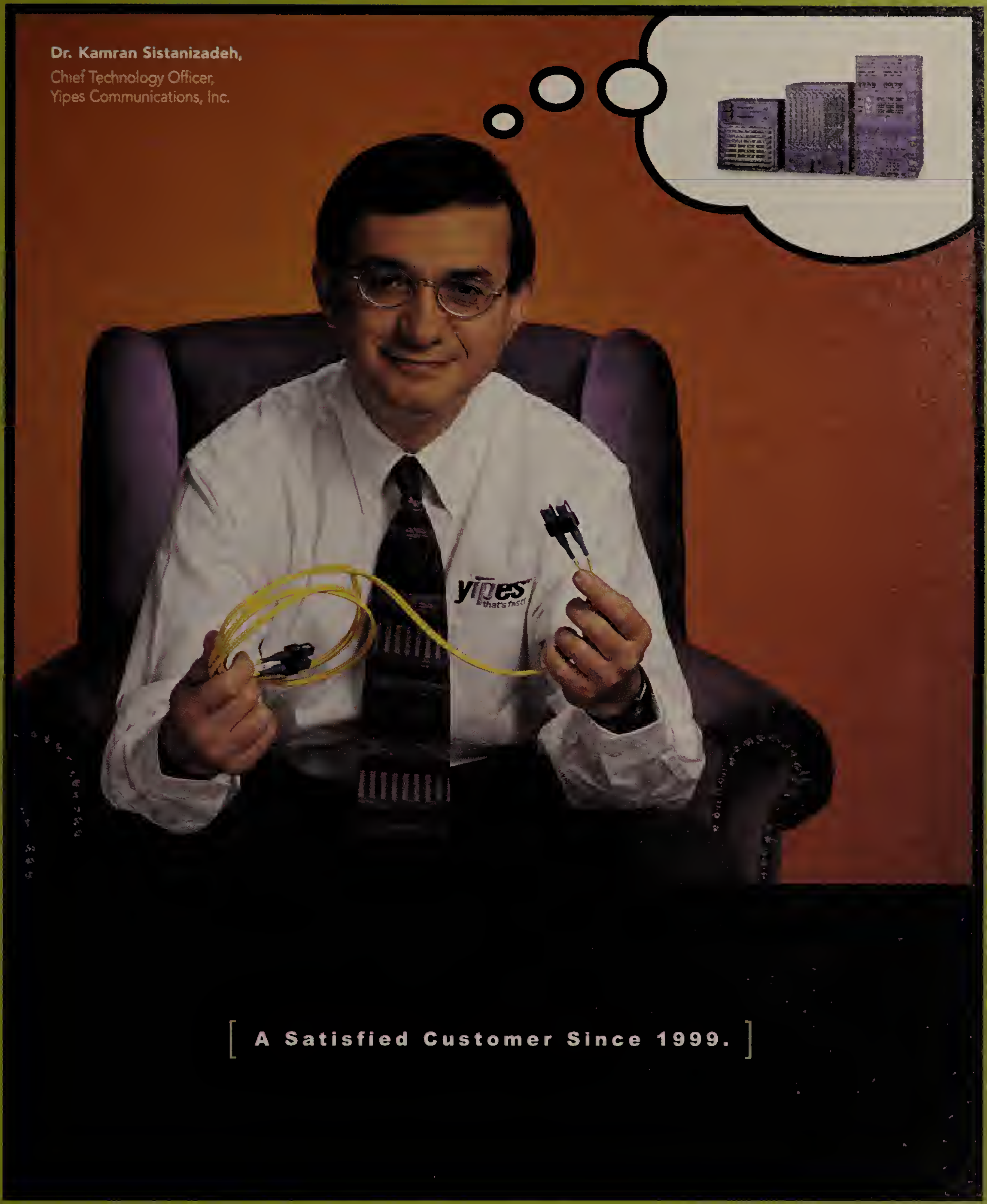
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Backspin

Skins — the way of the future

While browsing Network World Fusion today, I turned (as one does) to Adam Gaffin's excellent weekly Compendium column and found a link to an article by Adam Barr, an ex-Microsoftie and author of a book titled *Proudly Serving My Corporate Masters: What I Learned in Ten Years as a Microsoft Programmer.*

Barr's opinion piece rails against the new trend in software for "skins" — customizations that let you change the way your applications look and feel and even sometimes how they work.

What we need, Barr argues, is more standardization, not less. Central to his argument is a quote from Jef Raskin (dubbed by many as "the father of the Mac") in the October 2000 issue of *Wired*:

MARK GIBBS

"The role of software is to make the functions of a computer more accessible. That role is enhanced by uniformity."

In Barr's column, he beats this drum, er, sorry, amplifies on this point with the following analogy: "Imagine a car manufacturer describing its 'innovative' new car, which allows you to switch the location of the pedals around. Now imagine your grandmother hopping in the car for a quick trip to the store, and you will get a feel for how disruptive themes are to a computer novice."

Now Raskin's quote seems to support Barr's view (though I might point out, Raskin's quote is not quite right — software is what the functions of the computer are created from — there's no digital essence that is brought to life by the software).

But Raskin speaks from the lofty vantage point of having shaped the original look and feel of the Mac. He is credited with Apple's selection of a single-button mouse while most of the Mac development team was hot for a three-button mouse. Raskin won, and this was the correct decision.

The reason why the one-button mouse was correct and why Raskin's quote was right lies in what the Mac was. Remember the first time you saw a Mac, the first time you played with one? Wow! It all made sense! It was a real system where all the functions and functionality were properly designed and well-presented.

But those days are gone — and long gone at that. The Mac is now as architecturally messy as Windows (though rather better coded) and extremely complex. Sure, Mac applications have more consistency with the overall interface design of the Mac than Windows applications have with Windows, but the model has definitely been compromised.

That is because the Mac now does things and works with devices that were never considered in the original design.

If we were to take the idea of the need for software interfaces to be uniform then we'd abandon even simple customizations such as being able to select which directories and drives applications could use. We wouldn't be able to select which items appeared in the menus and tool ribbons of complex applications such as Adobe Photoshop and Microsoft Word.

Sure, how applications worked on the surface would be predictable but it is, a priori, impossible to design a user interface, or for that matter any software system, that can meet all possible operational requirements of real users now and in the future.

And Barr's car analogy might seem sensible, but think about it — if you could so easily rearrange the car's layout, when Grandma hops into the car you could just as quickly and easily restore the default configuration for her.

That's the point in giving users choice and control over how an application works for them rather than artificially constraining them to a user interface look and feel.

I have waxed enthusiastic in previous columns about customizable user interfaces (www.nwfusion.com, DocFinders: 3442, 3443), and I firmly believe that skins, rather than being a trend, are the next evolutionary step in applications.

Tell nwcolumn@gibbs.com how you look and feel.

'NET BUZZ

The latest on the Internet industry

PAUL MCNAMARA

The recent demise of a Dell-backed start-up called All.com raised doubts in some circles — think of this column as a circle — regarding the long-term prospects of other online tech support ventures.

Fear not, says **HotDispatch CEO Mike Kaul,** whose fledgling company peddles the technology behind "community knowledge marketplaces" designed for IT professionals who use and develop around platforms from the likes of **Palm, Bluestone** and **Sun.** Forgiving his use of the word "ecosystem," Kaul makes a good case that these linked communities offer large IT shops and developers access to a depth and breadth of expertise — plus actual code — that is faster and less expensive than otherwise possible.

HotDispatch is fulfilling about a thousand custom projects and 10,000 questions per month, Kaul says, for prices that have ranged from $50 to $30,000. About 40,000 individuals are participating, with about 30% outside the U.S.

"The average response time is hours," he says.

Of course, that lickety-split response may come from a person you've never met living in a place you couldn't find on a map. So what about trust when it's your job on the line?

"You don't have to pay anything until you've actually looked at and tried the response," Kaul says. "If I've solved your problem for you and the thing works, do you really care who I am and where I am? ... You don't."

There's also a performance rating mechanism that helps separate the hotshots from the pretenders.

HotDispatch turns a buck through a 15% fee on transactions and a licensing fee paid by the franchisees, with the latter being the company's bread and butter.

Not all business models that make sense make money ... but this one does make sense.

If Buzz were the gambling sort ...

Wait a minute: Buzz *is* the gambling sort, whether we're talking about the office **March Madness** pool (my money is on Duke), a Friday night poker game or a trip to Vegas to "cover" a trade show.

On the Web or in real life, it says here that all forms of gambling ought to be legal as long as the transaction does not involve death, dismemberment or a Ouija board. Regulate it, tax it, prohibit sucker advertising and make those profiting help pay for the treatment of those who bet the house and lose. But there's no reason to treat as a crime an activity that most Americans enjoy and all but a handful of states shamelessly exploit through lotteries and casinos as an alternative to levying taxes.

This predisposition piques my interest in companies such as **WorldWinner.com** of Newton, Mass., which brokers online competitions between individuals or groups. According to WorldWinner President **Zorik Gordon,** about 3,000 people per day put up "entry fees" that range from 60 cents to $9 for the thrill of competing in various games. Winners profit, losers weep, and WorldWinner takes a taste of the action.

Despite what you may have heard about online gambling sites running afoul of the law, Gordon claims WorldWinner is legal in 40 states because it hosts "exclusively skills-based gaming" as opposed to games of chance. Those in the other states are allegedly kept at bay.

"We did ample legal research over the course of almost a year," he says.

Not to doubt those lawyers, but Buzz has done ample political research for more than two decades in the state that WorldWinner calls home. You can bet your last nickel that the legal distinctions Gordon depends on will be utterly lost on the movers and shakers who call the shots on Boston's Beacon Hill.

Sooner or later, WorldWinner is going to catch some heat. Book it.

Write to buzz@nww.com with your comments, and the odds are excellent you'll win a reply.

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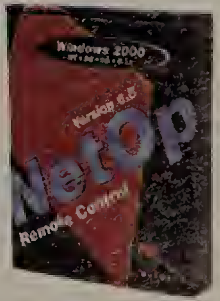

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